ONYX-RAD
Professional Workstation

USER MANUAL

TABLE OF CONTENTS

Welcome to Onyx-RAD 7
- Welcome to Onyx-RAD 8
- Easy To Use 9
- The Study List 11
- The Image Viewer 13
- Other Features / Options of Professional Workstation 15
- How to Use This Manual 16

Brief Walkthrough of Professional Workstation 19
- Introduction 20
- Log On 21
- The Study List screen 22
- The Image Viewer screen 24
- Going Further 26

Acquire Images 29
- Introduction to Acquiring Images 30
- Acquiring Orex Images : Step by Step 31
- Importing Images from DICOM CDs 40

The Study List Screen 43
- An Overview of the Study List Screen 44
- Columns in the Study List 46
- Rearrange Study List Columns 47
- Remove Study List Columns 47
- Restore Study List Columns 48
- The Study List Filter Window 49
- Patient's Studies window 51

Select a Study for Viewing 51

The Image Viewer Screen 53
An Overview of the Image Viewer Screen 56
The Series Window 57
The Image window 59
The Config Bar (Image Bucket tab and Study tab) 60
Image Viewing Tools 62
Width & Center 63
Zoom 65
Pan 66
Magnify 67
Invert 68
True Size (1:1) 69
Fit To Window 70
Unsharp Masking 71
Gamma Correction 72
Contrast 73
Annotations : Introduction 74
Annotation : Line 75
Annotation : Ellipse 76
Annotation : Box 77
Annotation : Arrow 78
Annotation : Freehand 79
Annotation : Text 80
Annotation : Measure 81
Annotation : Angle 82
Annotate : Delete All Annotations 83
Annotations : Editing and Deleting 84

Advanced Viewing Operations 89
Key Images : an Overview 90
DICOM Elements (“Tags”) 92
Histogram 93
Compare Mode (Compare Series in One Study) 95
Comparing Multiple Studies 96
ROI Tool 97
Patient / Study Merge 99

Printing (Paper and Film) 99
Printing Overview 104
The Image Bucket 106
Drag Individual Images to the Image Bucket 106
Drag a Complete Series to the Image Bucket 106
Print to Paper 107
Print to Film 109
Clear the Image Bucket 111
Adding DICOM Printers 112
Configuring DICOM Printers 113
Removing DICOM Printers 119

CD Burning 121
Introduction to Burning CDs 122
Creating a Patient Disc 123
CD Burning Configuration 126
CD Archiving 128
Importing Exams from Archive CDs 131

Send and Receive Exams 135
Sending Exams : Introduction 136
Sending Exams: .ONX or DICOM 137
Send (“Push”) an Exam 138
Monitor the Progress of Pushed Exams 139
Requirements to Receive Exams 141
Sending Exams via DICOM : Configuration 142
Set up AE Titles 142
Set up Contact Entries 145
Automatic Sending (“Routing”) 148

Every Toolbar 151
The Toolbars : Overview 152
Standard toolbar 153
View Operations toolbar 154
Image Left-button Operations toolbar 155
Image Layout toolbar 156
Annotations toolbar 158
Group Control toolbar 159

Installing Onyx-RAD 161
Installing 162

Configuration Manager 177
Start Configuration Manager 178
AE Node Editor 179
Contact Editor 182
Exam Routing 186
General Server Config 189
Image Server Config 191

Space Management Server 195
Space Management Server 196
Configuration 197
Manage by Study Date 198
Manage by Study Count 198
Manage by Disk Space 199
Study Statuses 199

Windows 2000 Primer 201
Using the Mouse 202
Mouse Click : Left or Right button? 203
Using the Keyboard 204
Menu bars (“Menus”) 205
Context Menus 205
Toolbars 206
Scrollbars 207

Viztek, Inc.
6491 Powers Avenue
Jacksonville, FL 32217

904-730-0446
800-366-5343

Onyx-RAD User Manual
Revision M4.01 - MILITARY
January 2003

Chapter

1

Welcome to Onyx-RAD

This chapter officially welcomes you to Onyx-RAD Professional Workstation. The chapter covers mouse button fundamentals, introduces the two main screens in Professional Workstation – the Study List and the Image Viewer, and offers a brief look at what else is available in this and other applications in the Onyx-RAD suite of medical imaging tools.

Chapter Contents

Welcome to Onyx-RAD.....8
Easy To Use 9
The Study List.....11
The Image Viewer.....13
Other Features/Options of
Professional Workstation.....15
How to Use This Manual.....16

Welcome to Onyx-RAD

The Onyx-RAD suite of Telemedicine PACS applications was developed specifically to handle the DICOM protocol, for both transmitting and viewing DICOM images and data elements. The applications were developed for networked PCs running Microsoft Windows NT and 2000, and offer an interface that users find to be quite intuitive after some initial learning.

The Onyx-RAD applications deal with all manner of DICOM images and modalities, including MR, CT, CR, US, and many others. These images can be viewed, manipulated, annotated, transmitted to other facilities, printed, animated and stored using the Onyx-RAD suite.

This manual is concerned primarily with the Onyx-RAD Professional Workstation application, though other parts of the suite will be explored as necessary (e.g., administrator configuration tasks.)

Easy To Use

Onyx-RAD is designed to combine a multitude of powerful tools with an intuitive and configurable interface.

With any software package, there is an initial learning curve that must be surmounted. Trial and error lead to familiarization and efficiency. First-time users of Microsoft Windows often become accustomed to it within a week or two of regular use.

Onyx-RAD builds on this by using menus, shortcuts, and operations which are similar to most other Windows programs, thus decreasing the learning curve and familiarization period. The Onyx-RAD applications make extensive use of toolbars, context menus, drag-and-drop functionality, menus, and shortcut keys to provide even more efficiency to your busy schedule.

The computer's mouse has two buttons (some newer models also have a third, the "middle" button, and/or a scroll-wheel in the center.) The behavior of these two buttons, referred to as the "left" and "right" buttons, respectively, is consistent throughout Onyx-RAD software.

The right mouse button: a single click with this button reveals a pop-up menu containing functions and options pertinent to the area of the software you are currently using. "Dragging" (hold the button down and move the mouse) this button is used primarily for functions like windowing an image while you view it.

The left mouse button: Almost all other tasks are performed with this button. A single click is used extensively throughout the software to select an item (e.g., select a study in the Study Listing, select an image in the Image Viewer, select a recipient on the "Send To" dialog, etc.) or activate a feature (e.g., clicking the appropriate toolbar button to activate the Zoom tool, clicking the "OK" button on a dialog in response to a question, etc.) Dragging with the

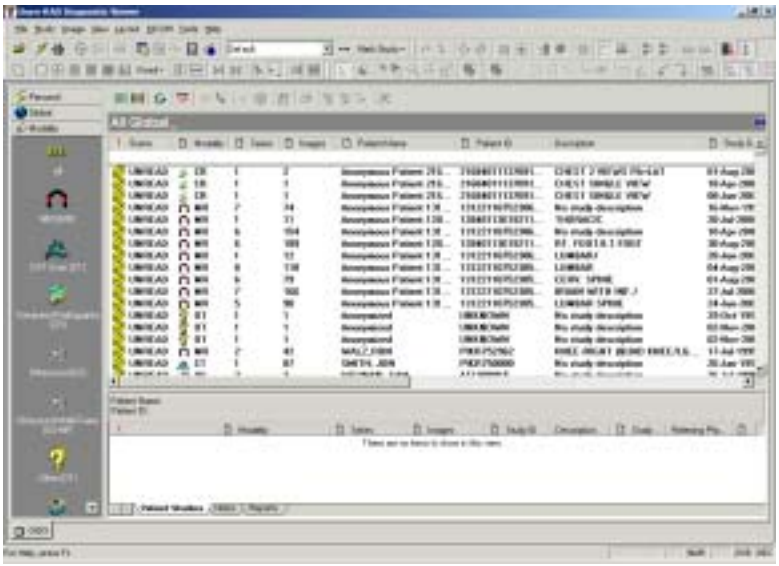
left mouse button is employed for two main functions in Onyx-RAD: dragging an object (e.g., dragging individual images to the Image Bucket for printing) or using a tool (e.g., after activating the Zoom tool above, dragging the left mouse button performs the zoom operation.)

These behaviors are consistent with most other software designed to run in Microsoft Windows, so you will find that you use the same mouse skills across multiple software products, and you will very quickly become accustomed to using the mouse.

Please see Appendix C for a Windows 2000 primer if you are unfamiliar with Windows in general.

The Study List

The basic functionality of Professional Workstation alternates between finding a study and viewing the images it contains. Thus, Professional Workstation has been divided into two different screens, the Study List (for finding your study) and the Viewer (for viewing and manipulating the images.)



The Study List screen

At the top of this screen are menu options and toolbars, below this are several smaller windows and a main window. This screen is intended to resemble some popular email applications, with filtering options on the left (for filtering the number and types of studies appearing the list) and the list of the studies in the main (and largest) section.

The listing itself is divided into many columns including Status, Modality, Patient Name, Study Date, Study Description, etc. Studies can be sorted by any of these columns, and many of the column headers actually double as search fields. All of these listing options enable you to

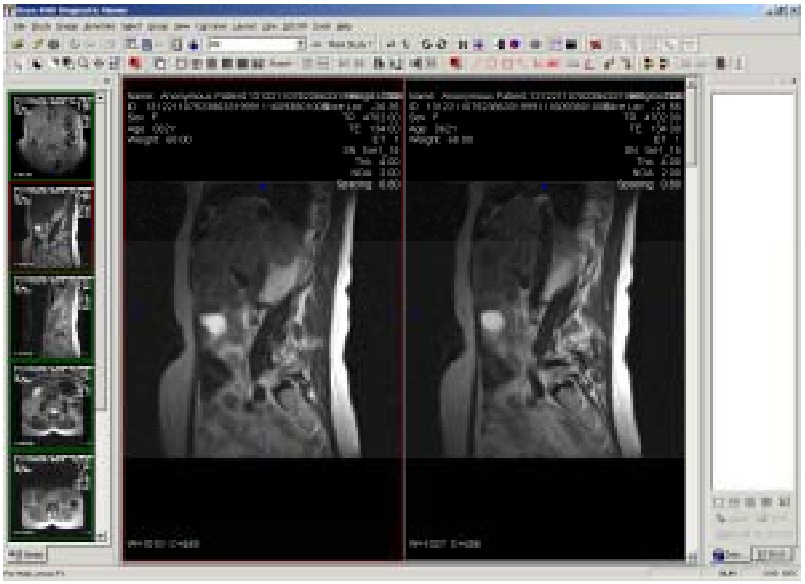
quickly find your desired study among the thousands of exams in your database.

The Study List screen also gives you access to other features of Professional Workstation, such as sending images to other doctors, creating Patient CDs, and acquiring images from film and plate scanners.

To view your study, you simply double-click it. This will open the exam in the Image Viewer screen (explored in the next topic.)

The Image Viewer

After locating your study in the Study List screen, a simple double-click will load up the images in the diagnostic-quality Image Viewer screen.



The Image Viewer screen

This screen retains the menus and toolbars found on the Study List screen (and adds a few menus and toolbar buttons) and sets up the remainder of the screen to aid in diagnostic viewing. The largest section of the screen is reserved for displaying the images, and be configured to display the images in any number of columns / rows (the sample picture above shows 2 column view.)

The smaller section on the leftmost side of the screen is the Series/Stacks window, which holds thumbnail images of every series (also referred to as a stack) in the exam. These thumbnails also act as buttons (allowing you to quickly navigate between series) and also indicate your

position in the current series via the actual thumbnail picture displayed and the progress bar at the top of each thumbnail.

The rightmost window seen in the sample picture is the Image Bucket, where individual images of interest are dragged for printing. With one click, the Image Bucket can be replaced with the Stats Bar which displays summary exam information like patient name, study date, and description, and holds quick buttons like Close Study.

The Image Viewer screen provides a vast array of powerful image manipulation tools to assist in your diagnosis. Images can be windowed/leveled manually and automatically, sharpened, flipped, rotated, zoomed, panned, and inverted. You can view “cut-lines” (image intersections, e.g. MRI studies), histograms, Hounsfield Units (for CT), and DICOM elements (“tags”). Additionally, you can animate (“cine”) entire series, mark individual images as “key images” (for quick reading later) and “Unsharp Mask” CR images. Various annotation tools are available, ranging from simple arrows and text boxes to angle and distance measurements. Advanced paper printing – including the ability to define exactly how the printed page will look beforehand – is also included.

Other Features / Options of Professional Workstation

Onyx-RAD Professional Workstation is highly configurable and modular. In its most basic form, Professional Workstation includes all of the advanced Study Listing and Image Viewing features mentioned above, including CD burning. Available modules add to this functionality by providing:

- Sending and Receiving images over phone line, local area networks, and the Internet. The Onyx-RAD suite features truly impressive teleradiology capabilities, including DICOM transmission/receive, and a proprietary format for transmissions between two Onyx-RAD machines utilizing compression, encryption, and auto-resume functions.

- Acquisition of images. Professional Workstation can be configured as a QC (quality control) Acquire station and connected to one of several compatible scanners, such as the Orex PcCR line of CR scanners, Howtek film digitizers, the VIDAR Diagnostic Pro film digitizer, Lumisys Film digitizers, frame-capture devices, and any acquisition device that already speaks DICOM.

- Film printing. For those instances where film is essential, Professional Workstation provides advanced capabilities and control over the final appearance of the printed film, and is compatible with virtually all film cameras.

How to Use This Manual

The next chapter offers a walkthrough for typical usage of Professional Workstation, which includes locating a study in the Study List screen, viewing and basic manipulation of the study's images in the Image Viewer screen, and returning to the Study List.

The rest of the chapters explore individual sections of Professional Workstation in greater detail, including the Study List and Image Viewer screens, advanced image viewing and manipulation tools / operations, printing to paper and film, creating Patient CDs ("cd burning"), sending and receiving exams, and acquiring exams from a supported acquisition device.

The appendices cover the Onyx-RAD Configuration Manager program as it relates to Professional Workstation tasks, the Onyx-RAD installation process, and a Microsoft Windows primer to cover the basic of using Windows as it relates to the use of Professional Workstation.

Chapter
2

Brief Walkthrough of Professional Workstation

This chapter offers a walkthrough for typical usage of Professional Workstation. The walkthrough includes locating a study in the Study List screen, viewing and basic manipulation of the study's images in the Image Viewer screen, and returning to the Study List.

Chapter Contents

Introduction 20
Log On 21
The Study List screen 22
The Image Viewer screen 24
Going Further 26

Introduction

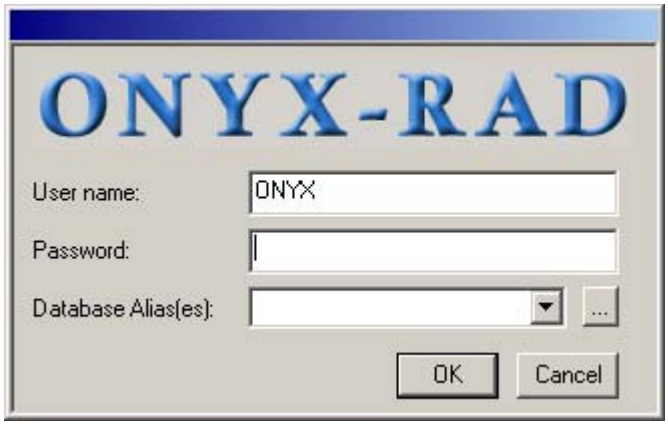
Onyx-RAD Professional Workstation (a.k.a. “Workstation” for brevity) is a network client application that allows users to view and manipulate vast amounts of DICOM and patient information.

There are two basic functions in Workstation: selecting a patient and viewing that patient’s images. As such, the program is divided into two interfaces: the Study List screen for selecting patient studies, and the Diagnostic-Quality Image Viewer screen for viewing and manipulating the images. As you use Workstation, you will find that you alternate between these two screens quite frequently.

In this chapter we will look at a sample user session of Viewer. This session includes the following steps:

- Logging In
- Study List screen:
    - Searching for a patient study in the database
    - Selecting a study to view
- Image Viewing screen:
    - Viewing the images of this patient
- Returning to Study List screen

Log On



(This dialog may not appear if your Workstation is configured to log on automatically.)

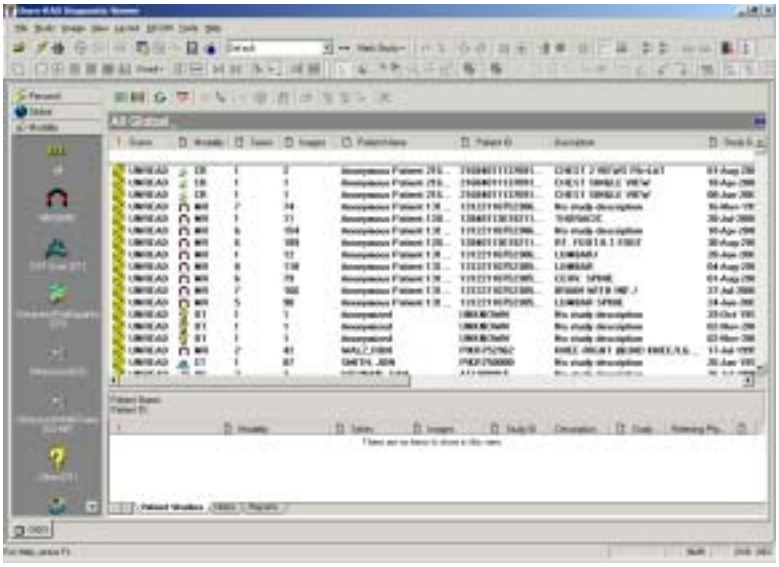
The first step in a Workstation session is to log on so that you may access the database of patient studies. The log on dialogue (shown above) consists of three boxes that must be filled in. The first two, username and password, are assigned to you by your database administrator (or similar authority). Requiring a valid username and password is an effective security measure for protecting the records of your patients.

The Database field contains the name of the database in use at your facility. In most cases it will already contain the correct name, and should not be changed. For our example session, our database name is “Onyx”.

Once you have filled in the three fields, click the OK button to enter Onyx-RAD Professional Workstation.

The Study List screen

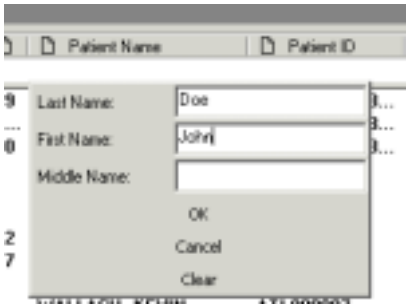
As stated earlier, Onyx-RAD Professional Workstation consists of two interfaces (screens), each with a separate function. The first interface you will see when entering Workstation is the Study List screen. This interface is used for searching and selecting patient studies and sending studies to other users. The picture below shows this screen.



At the top of this screen are menu options and toolbars, and below these are several smaller windows and a main window. These windows simulate an email application, with the largest window listing the patients currently in the database along with their many attributes, the way an email program would list emails in an inbox. This listing window is divided into columns such as Status, Modality, Patient Name, etc., with scrollbars (vertical and horizontal) allowing you to scroll through the many records in the database. Icons on the far left of the screen toggle the display list by ALL, UNREAD, READ, and INCOMPLETE studies.

In our example session, we are interested in a particular patient whose exam was entered into the database recently, so we will sort the listing by date by clicking the “Date” column heading.

The listing is now sorted by Date, but for our example this hasn’t helped us much because there are many studies that were entered recently. Our next step is to perform a quick search for this patient by name. To search by any field in this study listing, simply double-click in the white space directly below the column heading, and type in your search terms. We are looking for a John Doe, so we type that in and click OK:



The Patient listing is updated to display only the patients that match the search criteria. From this reduced listing we can see our desired patient. Now to view the images in this study, we double-click the Patient’s listing. The images will begin to load and the Image Viewer screen will appear, temporarily hiding the Study List screen, which is not needed for the moment.

The Image Viewer screen

After double-clicking the selected study you will be whisked away to the Viewer screen. This screen is a Diagnostic Quality image viewer where you will perform all of your image viewing and manipulation.

Note that the menu bar and toolbars have remained at the top of the screen, gaining some additional items. Only the workspace has significantly changed, with a new set of windows designed to enhance viewing.

Leftmost is the Series Window, which displays thumbnails of each series in the study. The largest window in the workspace is the actual viewing window, where the image(s) are displayed.

The images are displayed in columns according to your selected number of columns. You will find buttons on the toolbar to change the number of columns used in the window.

The buttons above allow you to use 1, 2, 3, 4, 16, or a specified number of columns for display.

The Viewer screen offers a large number of tools and functions for viewing medical images. Please see the appropriate sections of this manual for more discussion of the features. You will find that most of the features can be accessed quickly through a toolbar button or the context menus.

When viewing is complete, there are two methods of closing the study to return to the Study List screen. If the Stats Bar is displayed (on the right-hand side of the screen), you can click the “Close Study” button. The other method is to right-click an image in the main image window (the largest section of the screen) and select the Close Study option (near the top of the menu.)

Going Further

This completes our sample session using Onyx-RAD Professional Workstation. We have only looked at the most basic functionality of the software: selecting and viewing a study. Professional Workstation contains many useful and specialized functions designed to increase efficiency and the quality of reading. Please review the more advanced sections of the manual to learn about them.

Chapter 3

Acquire Images

Onyx-RAD Professional Workstation can be configured as an acquire workstation and combined with an Orex PcCR.

Chapter Contents

Introduction to Acquiring Images 30
Acquiring Orex Images : Step by Step.....31
Importing Images from DICOM CDs.....40

Introduction to Acquiring Images

Onyx-RAD Professional Workstation, when attached to an Orex PcCR scanner becomes a powerful acquire workstation where exams are acquired, checked for quality control ("QC'ed"), diagnosed, stored, and transmitted – all on one workstation.

An attached Orex scanner scans raw image data from phosphor plates (housed inside the cassette on PcCR 1417 models). The Onyx-RAD software then converts this data to DICOM compliant format and compresses the data in JPEG Lossless mode and stores the resulting study on the workstation.

Acquiring Orex Images : Step by Step

Step 1 : Ensure Scanner is turned on

Ensure the Orex CR scanner is turned on. If it is not, please turn it on. (The power switch is located on the back of the scanner, and powering up may take from 20 seconds to 60 seconds. Some Orex CR scanners, especially the newer "auto cassette" models, may take a few seconds before they respond to the power switch being flipped on, so please be patient. This delay is due to the scanner running internal diagnostic tests.)

Step 2 : Start Workstation (if not already running)

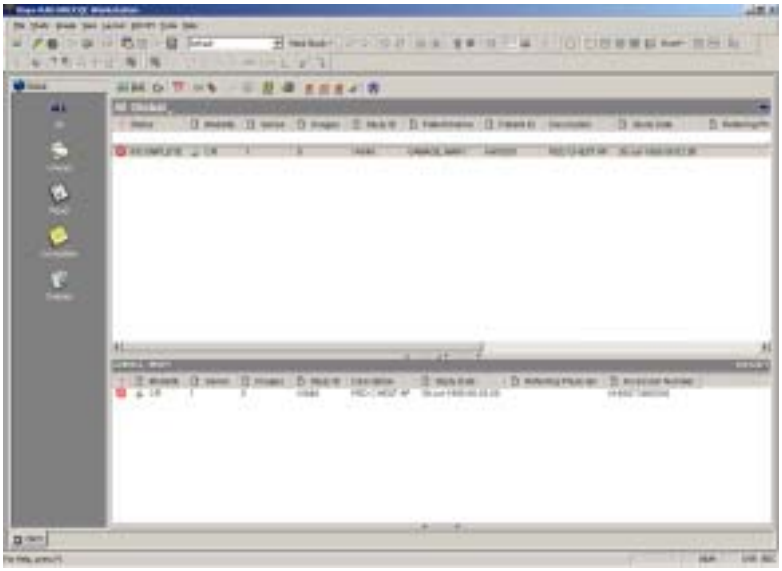
If the Onyx-RAD Orex QC Workstation application is not already running, start it by double-clicking (with the left mouse button) the icon titled "Onyx-RAD Orex QC Workstation."

Step 3 : Log On (optional)

(optional) If your Workstation has not been set up to automatically log you in to the database for security reasons, you will need to do so manually. To do so, click on the "File" menu and choose "Log On" (or you can click the lightning bolt icon.) Enter your user name and password in the dialog box that appears, and choose your database from the drop-down list.

Step 4 : “Study Listing” screen

Once you are logged in, you will see a screen similar to the screenshot below.



As seen in the Overview on page 43, this screen is the “Study Listing” screen. All of the studies in your database are listed here and can be sorted by any of the fields, although the “Patient Name” and “Study Date” fields are perhaps most useful.

Step 5 : New Patient / New Study / New Series

Now its time to add an entry for the image(s) you will scan. You must decide whether to add a new patient, study, series, or image.

New Patient: If the patient is not listed in your Study List, you must add a new patient.

1. Click the New Patient button (the red “P”).

New Study: If the patient is already listed in the Study List, and this is a new exam (e.g., a follow-up examination), you should add a new study for this patient.

1. Find the patient in your Study List (see the previous chapter for a brief introduction to the Study List screen, including sorting and searching the Study List).
2. Click the line containing the existing patient so that the line lights up (highlights.)
3. Click the New Study button (the red “S”).

New Series. If you are adding multiple images to one study, it is suggested that you create a new series for each image.

1. Find the patient in your Study List (see the previous chapter for a brief introduction to the Study List screen, including sorting and searching the Study List).
2. Click the line containing the existing patient so that the line lights up (highlights.)
3. Click the New Series button (the red “E”).

New Image. If you are adding multiple images to one study, and you wish to group images under the same study (e.g., perhaps you have two images of a lateral chest and one chest AP, and you desire to have the two lats in one series, with the AP in second series), you should use the New Image button to add images to the current series. (Viztek recommends that you put each image in a new series [use the New Series button] as it simplifies later viewing.)

1. Find the patient in your Study List (see the previous chapter for a brief introduction to the Study List screen, including sorting and searching the Study List).
2. Click the line containing the existing patient so that the line lights up (highlights.)
3. Click the New Image button (the icon is of a spool and film).

Test Scan. This button is for diagnostic testing of the Orex PcCR unit. You should not need to use this button unless you are instructed to do so by a Viztek technician. Images are *not* saved when running a test scan.

Step 6 : Enter Patient / Study / Series details

After clicking one of the buttons described in Step 5, you are presented with a dialog asking for relevant details.

If you are adding a New Study, Series, or Image, the dialog will be partially completed for you, using data from the existing patient record (e.g., Patient ID and Name will already be filled in.) You will be unable to change these fields.

To enter data into a field, simply click the white box next to the field and start typing. Although there are many fields on the dialog, the only required fields are marked with an asterisk, are listed here:

- *Patient ID* : This must be unique for every patient. It

is suggested social security numbers be used for this field, or any other uniquely identifying tag. (This field can be letters, numbers, or a mix of both.)

- *Gender*
- *Patient Name : Last Name* : Only the last is required, but it is suggested that both last and first name be entered.
- *Patient Birth Date* : This must be entered in MM-DD-YYYY format. Please ensure that you use a four-digit year.

Enter values for at least the required fields and click "Accept" to open the Orex CR scanner interface.

Step 7 : Orex Scanner Interface

Patient Outline

Select the correct anatomic region by clicking this figure.

The Orex scanner interface screen will now appear. The left side of this dialog has a patient outline. Click on the portion of the body of which you are scanning, and choose the correct anatomic location from the menu that appears.

This is an important step in ensuring quality images. Just as it is necessary to increase technique when shooting denser parts of the patient's body, the Orex scanner must similarly adjust its sensitivity when reading plates that have more exposure. Choosing the correct body part from the Patient Outline (seen above) will ensure that the Orex scanner properly scans the shot.

Step 8 : Insert the Cassette

Insert the cassette into the Orex scanner, and push gently until it locks into place with an audible "click." The scanner will quickly load the plate from the cassette and display a message similar to "14x17 plate ready" near the bottom of the screen.

Step 9 : Start scanning

Start Scanning

You are now ready to scan. To start the process, click the "Start Scanning" button found at the bottom left portion of the Orex screen.

Scanning may take up to two minutes, depending on the size of the plate. During the scan you can observe the progress window as it shows, in real-time, what has been scanned thus far. Additionally, a timer in the bottom-right corner of the window keeps track of the remaining scan time.

Step 10 : When the scan completes…

When the scan has completed, please wait a few moments for the communication between the computer and the CR scanner to complete. (You will see a small dialog window indicating "Processing Image…" during this time.) While the Onyx-RAD software processes and imports the image, the Orex scanner will begin erasing the plate. The Orex erasing process can last up to a minute, and the Onyx-RAD import process should only last between ten and thirty seconds.

When the Orex scanner has finished erasing the plate, an audible "click" will indicate that the cassette may be removed.

When Onyx-RAD finishes importing the image, the "Processing Image…" dialog will disappear. If this scan was a new patient, you will notice the patient's entry on your listing screen (you may need to scroll down if your listing is very long.)

If this scan was an additional series/image to an existing study, you will notice the number of series/images for the study has been updated.

Step 11 : “QC” the image(s)

When you have completed the scanning and have no more images to add to the study, it’s time to perform some quality control. The study is currently marked “INCOMPLETE,” indicating that the technologist has not yet verified and/or prepared the images.

At this time you should open the study (double-click the study; see the previous chapter for a brief introduction to the Study Listing screen and the Image Viewing screen.)

View the images and optionally prepare them for the doctor by adjusting the contrast or zooming, etc.

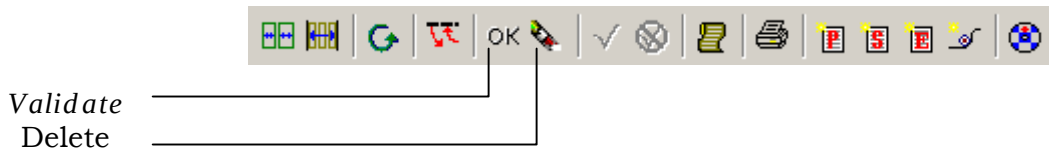
When you are satisfied with the images, close the study (right-click on an image, then choose “Close Study”).

Back at the Study Listing screen now, you should validate the study (which changes its status from INCOMPLETE to UNREAD) with the following procedure:

1. Click the study one time to select (highlight) it.
2. Click the “OK” button to validate the study. This button is found to the left of the New Patient / Study / Series buttons, and is pictured below.

If you wish to delete the study (perhaps the images were really off, or the wrong body part was scanned?), use this procedure:

1. Click the study one time to select (highlight) it.
2. Click the delete button to validate the study. This button is found to the left of the New Patient / Study / Series buttons, and is pictured below. (It is a picture of an eraser.)



Importing Images from DICOM CDs

Please refer to the section titled “Importing Exams from Archive CDs” on page 131 for this procedure.

Chapter 4

The Study List Screen

This chapter explores in detail the first of two screens you will constantly alternate between while using Professional Workstation. This screen lists all of the exams in the database(s) you are connected to, allowing you to filter and sort the listing as you navigate the list.

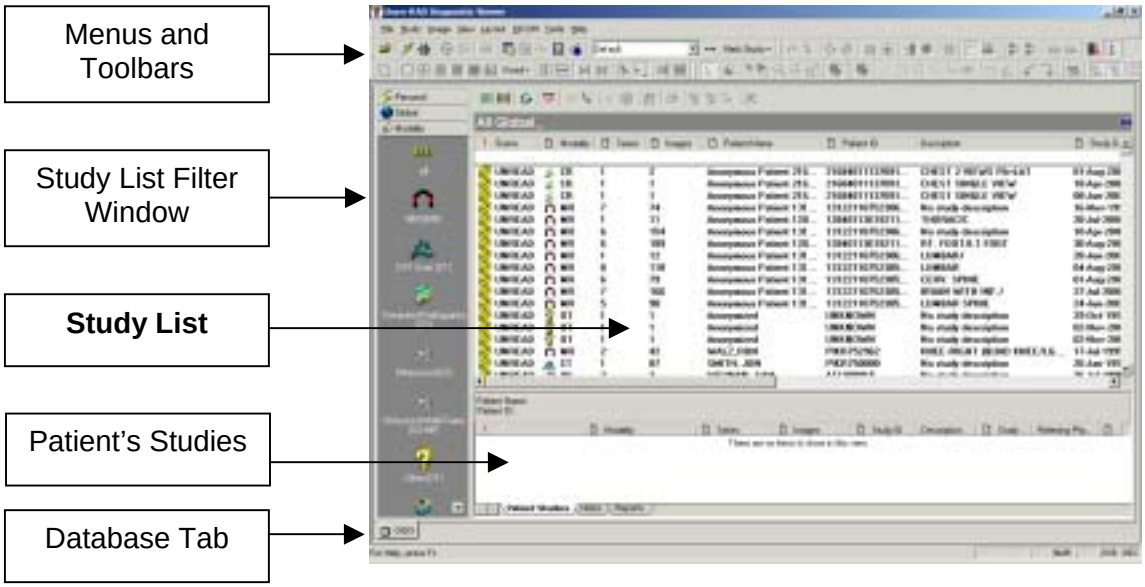
From this screen you can also change a study's status, send it to another site, create Patient CDs, and view study histories.

Chapter Contents

Overview of the Study List screen 43
Columns in the Study List 46
Rearrange Study List Columns 47
Remove Study List Columns 47
Restore Study List Columns 48
The Study List Filter Window 49
Filter by Study Status 49
Filter by Study Modality 50
Filter by both 50
The Personal Button 51
Patient's Studies window 51
Select a Study for Viewing 51

An Overview of the Study List Screen

Let's start by identifying this screen's distinct parts.



The *Menus and Toolbars* hold entries and shortcuts to common functions of Workstation. Note that most of the toolbar buttons are "grayed out", i.e., disabled, because they have no relevance on this screen.

The *Study List Filter Window* holds icons representing study statuses and the various modalities that Workstation supports. Clicking any one of these icons will update the main study listing to display only the studies whose status or modality matches the icon clicked.

The ***Study List*** is the largest and most important part of this screen, as it holds the actual listing of studies in your database. The list is divided into several columns (completely configurable as we'll see later) to organize all of the information available – like Patient Name, age, sex, and birthdate, the study's status, number of series and number

of images, description, originating institution, etc.

The *Patient's Studies* window is a handy tool which works in conjunction with the study listing to quickly show you all of the studies associated with the selected patient.

The *Notes Window* quickly displays study notes entered by a technologist at the time of QC'ing (quality control/checking) the images.

Finally, the *Database Tab* (or *Tabs*) indicate which database(s) you are currently logged onto. Professional Workstation allows you to log onto multiple databases simultaneously and switch between the listings by way of these easy one-click tabs.

Columns in the Study List

The columns available in the Study List are (listed here in default order):

- Status
- Modality
- Series
- Images
- Study ID
- Patient Name
- Patient ID
- Description
- Study Date
- Referring Physician
- Gender
- Age
- Date of Birth
- Social Security Number
- Accession Number
- Institution Name
- Owner
- Group

The column header themselves serve double-time as buttons which you can click to sort the study list by that field. For example, click the Patient Name column header to sort the list by Patient Name, ascending. Click the header again to reverse the sort (resulting in Patient Name, descending order.)

After sorting the list you can use the scroll bar on the right side of the list to scroll through the list and find your desired study.

Rearrange Study List Columns

The column listing on the previous page follows the default order of the columns in the Study List. However, these columns can be rearranged in any order desired. Simply "drag" (left-click and hold, then move the mouse) the column header to its new place between two other column headers. As you drag the column header between two other column headers, little red arrows will appear to indicate a valid placement for the header. Simply release the mouse button to drop the column header into place.

All column headers can be moved around in this manner.

Remove Study List Columns

You may find that you prefer to have certain columns listed in the Study List. This may be because the information is unnecessary or not available (e.g., many institutions do not use an Accession Number.)

To remove a column header, simply "drag" (left-click and hold, then move the mouse) the column header down. After you have dragged the column header below the other column headers, release the mouse button and the column header will disappear.

You can remove as many column headers as you like.

Please see the next topic for information on restoring column headers.

Restore Study List Columns

Because it is very easy to remove column headers, it is quite possible that you or another user may remove column headers.

To see a list of columns that have been removed, click the "worklist Fields" button, seen below:

Worklist Fields button

A "Field Chooser window appears containing all Study List columns that have been removed:

To restore a column, "drag" it (left-mouse click and hold, then move the mouse) from the Field Chooser window to its new spot on the Study List, between two other columns. (When you drag the column header between two existing columns, little red arrows appear indicating that your column can be inserted here.) Release the mouse button and the column will be inserted.

The Study List Filter Window

Sorting the study list by any column is handy enough, but once you begin to accumulate hundreds of studies, the list becomes quite long and more time-consuming to navigate by scrolling through it. Filtering what is displayed in the list becomes essential.

The Study List Filter window contains three horizontal buttons labeled “Global,” “Personal,” and “Modality.”

Filter by Study Status

To filter by study status, click the “Global” button. Observe the icons available: All, Unread, Read, Incomplete, and Deleted. Click any one of these icons to alter the studies displayed.

All : Display studies of any status.

Unread : Display only studies marked Unread. Unread studies have been validated by a technologist and are awaiting diagnosis.

Read : Display only studies marked Read. After reading and diagnosing a study you should mark it Read to indicate this.

Incomplete : Display only studies marked Incomplete. These studies are considered “incomplete” because either (a) the images are still coming into the system (from the modality or another sender), or (b) the technologist has not yet validated this study (at which time the study will become “Unread”.)

Deleted : Display only deleted studies. Studies marked deleted remain on the system for a time. If you need to access a study you’ve deleted, click this icon.

Filter by Modality

To filter by modality, click the “Modality” button. Observe the icons available – one for each modality that Workstation supports. (Also notice the downward arrow button at the bottom-right of the Filter window, indicating more modality icons to choose from. Click this arrow to see more modality icons.)

Simply click the desired modality icon to filter the study list appropriately. Click the “ALL” icon to display studies from all modalities.

Filter by both

You can filter by a combination of status and modality. Simply click your first filter icon (either a modality or status icon), and then an icon from the other filter list.

Note that the gray title bar for the Study Listing will update as you change the Status or Modality filter type. “All Global” changes to “Unread Global” when you click the “Unread” icon, and you will observe that only studies whose status is “Unread” will be displayed. Note that clicking the “ALL” icon returns the display to “All Global” and studies of all statuses are again displayed.

Filtering by modality will similarly change the title bar. The sample picture below shows the title bar after clicking “Unread”, and then additionally filtering by MR modality.

The Personal button

The “Personal” button in the Filter window works the same way as the “Global” button, and displays icons to filter by study status. The personal view, however, is intended to provide a personalized view of the database. Generally, it is recommended to use the Global button.

Patient’s Studies window

When you single-click a study in the study list it becomes the selected study. Workstation will quickly search through the study list to find every other study for this selected patient, and after a moment displays these studies in the Patient’s Studies window. This enables you to quickly see all studies for the patient you are interested in. You can also select the study to view from this window just as you do from the main study list window.

Select a Study for Viewing

When you have located your desired study, simply double-click it in either the main study list window or the patient’s studies window.

Chapter 5

The Image Viewer Screen

This chapter explores in detail the second of two screens you will alternate between while using Professional Workstation. This screen displays the images contained in Patient exams.

A wide range of manipulation tools is available to aid in your reading and diagnosis.

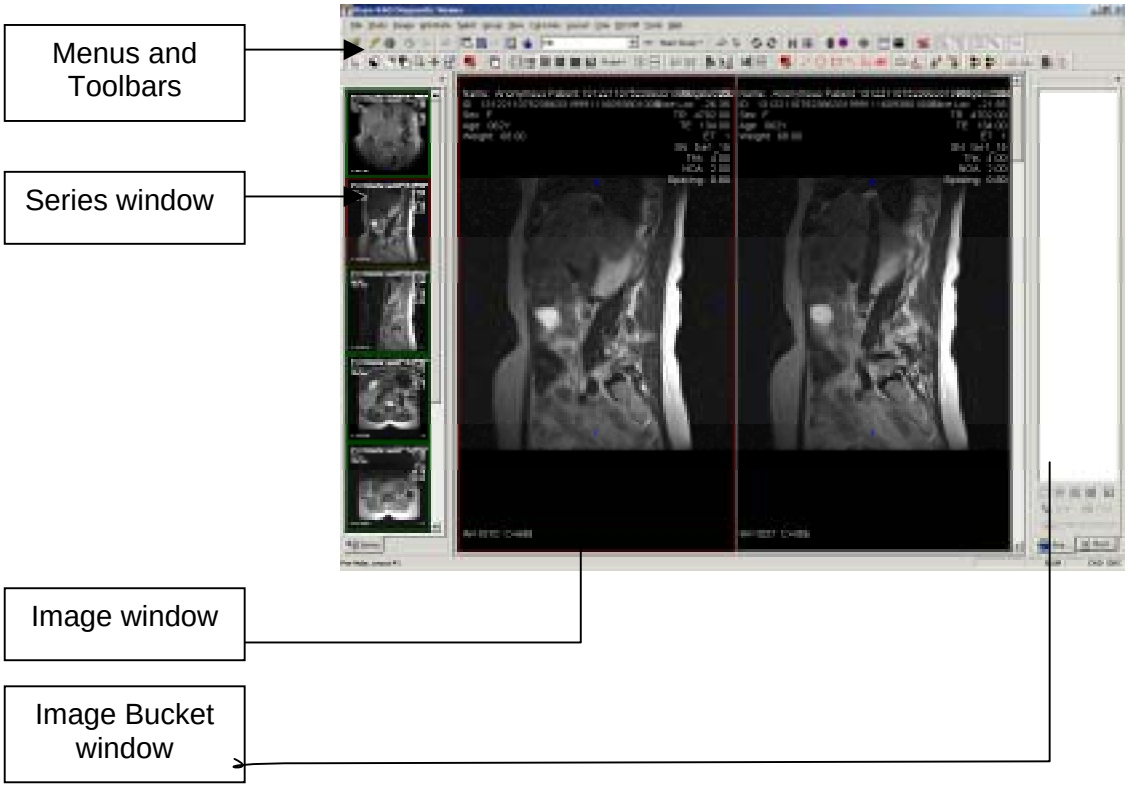
Chapter Contents

An Overview of the Image Viewer Screen 56
The Series Window....57
The Image window....59
The Config Bar....60
Image Viewing Tools 62
Width & Center 63
Zoom....65
Pan 66
Magnify 67
Invert....68
True Size (1:1) 69
Fit To Window....70
Unsharp Masking....71
Gamma Correction 72
Contrast 73
Annotations : Introduction 74
Annotation : Line....75
Annotation : Ellipse 76
Annotation : Box 77
Annotation : Arrow 78

Annotation : Freehand 79
Annotation : Text.....80
Annotation : Measure.....81
Annotation : Angle 82
Annotate : Delete All Annotations 83
Annotations : Editing and Deleting.....84

An Overview of the Image Viewer Screen

Let's start by identifying this screen's distinct parts.



The *Menus and Toolbars* are similar to those seen on the Study Listing Screen (explored in the previous chapter), but now include more menus and functions that are relevant to manipulating images.

The remaining sections of this screen are described in separate topics, below.

☼ Remember that screenshots here may look slightly different from your workstation due to customization.

The Series Window

☼ As part of the customization available, the Series Window can be turned on and off at any time. To accomplish this, see page 59.

Leftmost on the screen is the Series/Stacks window, in which every series (or "stack") of images is indicated by a thumbnail picture of the first image in that stack.

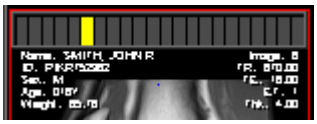
At any time, the series which is currently being viewed (in the Image Viewing area) is noted with a red border around it. (On grayscale monitors, a thick white border is observed.)

A patient study may contain many series, all of which are loaded when the study is opened. All series are loaded into the Series/Stack window as thumbnail images, and generally the first image(s) of the first series is displayed in the Image Viewing area. To view another series, simply move the mouse cursor over the series thumbnail (in the Series window) you wish to view, and click the left mouse button one time.

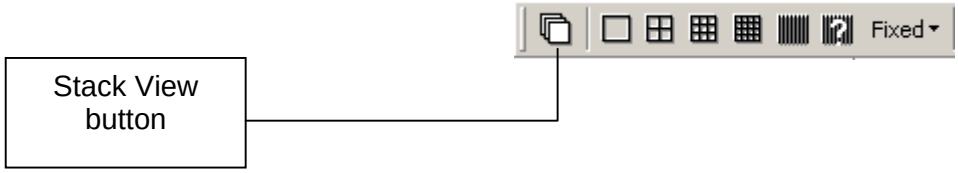
Note that on studies where the technician has entered Study or Series descriptions, holding the mouse cursor over a series thumbnail (in the Series/Stack window) for a moment or two will display a "tooltip" hint showing the description.

The series thumbnails update to show the current image being viewed as you move through the study in the main Image window. Additionally, there is a gray progress bar at the top of each thumbnail that displays visually your position in the current series, indicated by the yellow box in the bar.

☼ You can also use this position bar as a navigational tool. Click anywhere along the gray bar to move to that position in the series.



Though the Series window is perhaps most useful with the series thumbnails displayed in one column, it is possible to change the number of columns at any time, by using two of the column layout buttons seen below:



First, click on the Stack View button to indicate that you wish to change columns for the Series window (otherwise you will affect the Image window.) Then click the button representing the number of columns you desire. Finally, it is a good idea to click the Stack View button again as most users expect the column layout buttons to affect the Image window, not the Series window.

The Image window

The largest area in the previous screenshot, the central area, is the Image window. This is where image viewing and manipulation occurs. In the sample screenshot, the images are displayed in a two-column format, which can be changed at any time (as we will see later.)

Note that only a limited number of images may be shown in the viewing area at one time (only so many will fit), thus a scroll bar is provided on the right-hand side of this viewing area to allow you to scroll down and see more images.

You can navigate through the images in a study by any of these methods:

- Use the scroll bar to the immediate right of the Image window
- Use the arrow keys on your keyboard
- Use the wheel on your mouse (if present)
- Click on the position bar in the series thumbnail (in the Series Window)

☼ See Appendix C for details on using scroll bars in Microsoft Windows.

When using the arrow keys, take note:

- Right arrow key moves forward in a series, Left arrow key moves backward.
- Down arrow key moves forward in a series, Up arrow key moves backward.
- Right and Left arrow keys *will not* advance beyond the current series.
- Up and Down arrow keys *will* advance beyond the current series.

☼ The ability to move to another series using the Right and Left arrow keys can be enabled in the Preferences dialog.

☼ Adjusting the number of columns.

The number of columns displayed in the Image window can be changed at any time by clicking on one of the column layout buttons, as seen here:

The Config Bar (Image Bucket tab and Study tab)

☼ As part of the customization available, the Config Bar can be turned on and off at any time. To accomplish this, see page 153.

Immediately right of the Image Viewing area is the Config Bar, which consists of two tabs: Image Bucket and Study. These two tabs are explored below.

Tabs such as these allow for multiple sub-windows to occupy the same space, providing more screen area for other things (most notably the Image Viewing area.) The tabs work the same way a tab in a rolodex would work. Simply click the tab you wish to view and that sub-window will appear in the Config bar space. In this example screen shot, the Image Bucket tab is selected.

Config Bar : Image Bucket tab

The Image Bucket is the gateway to printing; all printing occurs through this handy little window. The window is composed of a large white area with several more buttons at the bottom. This white area is used to hold the images you will print. The buttons at the bottom perform actions specific to the Image Bucket.

Please see the chapter 6: “Printing” for more information on printing and using the Image Bucket.

Config Bar : Study tab

This sub-window is handy informational and shortcut window when viewing a patient study. The top portion of the window lists the Patient ID, Patient Name, Study ID, Study Date, and Study Description for the current study.

Below these fields are three large shortcut buttons:

Mark Read : click to change the study's status to "Read." (un-available if the study is already "Read".)

Mark Unread : click to change the study's status to "Unread".

Close Study: click to close the study and return to the Study Listing screen.

Image Viewing Tools

Onyx-RAD Professional Workstation features a vast array of image manipulation tools to assist in diagnostic interpretation of medical images.

All of the tools described in this chapter have easy, one-click toolbar buttons to activate them. They are also available from the Image Context menu (right-click on any image), and additionally can be found by navigating the menus in the menu bar.

Each topic below names an image manipulation tool, lists the ways to activate it (toolbar button, menu entry, etc.), and explores its usage.

Width & Center

the Width & Center toolbar button

This is the most basic and yet most important tool available, as it adjusts the width and center (also known as "window and level", or simply brightness and contrast) of an image.

Adjusting the width and center of an image allows for viewing different "levels" of an image, e.g., moving from bone to soft tissue.

☼ A quick and easy shortcut to using the Width/Center tool is to simply hold down the right mouse button while moving the mouse around the image.

To perform the width & center:

1. Place the mouse cursor over the image.
2. Hold down the right mouse button.
3. Move the mouse horizontally and/or vertically; the image is adjusted as you do so.
4. When satisfied with the image, release the right mouse button.

Horizontal movement of the mouse adjusts "center"; vertical movement adjusts "width."

This tool can be also be activated with its toolbar button (above). Click the toolbar button to turn this tool on, and use it by holding down the left mouse button while dragging the mouse over an image.

The width & center tool can also be found in the Image menu, or by right-clicking any image and choosing the tool from the context menu.

Width & Center all images in a series

☼ Width and Center all images in the series.

Note that if the "Share single frame properties" button is enabled, whatever width & center changes you make to one image will also apply to all other images in the same series.

To enable or disable this behavior, click the “Share single frame properties” button.

Zoom

the Zoom toolbar button

This tool is used to zoom the entire image "in" (for closer inspection) or "out" (view the whole image at once.)

To use this tool, first activate the Zoom tool. This is accomplished by either clicking the Zoom button on the toolbar, or by choosing the Zoom entry from the Image Context menu.

The mouse cursor will change to the Zoom tool cursor.

To perform the zoom:

1. Activate the zoom tool.
2. Place the cursor over the image.
3. Hold down the left mouse button.
4. Move the mouse up to zoom in, down to zoom out.
5. Release the left mouse button.

☼ The Zoom tool is very sensitive. Move the mouse slowly when zooming.

Note that as you zoom images in it may no longer be possible for the entire image to fit in the window, thus the Pan tool may be of some assistance in moving the image around.

Zoom all images in a series

☼ Zoom all images in the series.

Note that if the "Share single frame properties" button is enabled, whatever zoom changes you make to one image will also apply to all other images in the same series. To enable or disable this behavior, click the "Share single frame properties" button.

Pan

the Pan toolbar button

Use this tool to move an image around within its display window.

To activate the Pan tool, either click the Pan button on the toolbar, or choose the Pan entry from the Image Context menu.

To perform a pan:

1. Activate the Pan tool.
2. Place the cursor over the image.
3. Hold down the left mouse button.
4. Move the mouse in any direction; the image will follow your movements.
5. When you are satisfied with the image's placement, release the left mouse button.

☼ It is possible to pan the image out of the image window. If this happens, either pan it back into view or click the "Fit to Window" button. (See page 70)

Pan all images in a series

Note that if the "Share single frame properties" button is enabled, panning one image will also pan all other images in the same series. To enable or disable this behavior, click the "Share single frame properties" button.

☼ Pan all images in the series.

Magnify

the Magnify toolbar button

☼ The popup window uses a 2x magnification. For greater magnification, zoom the image in first with the Zoom tool, then use the Magnify tool.

Use this tool to magnify parts of an image, similar to using a magnifying glass. This is in contrast to the Zoom tool, which will zoom the whole image. The magnifying tool creates a temporary pop-up window which you can move over the image as you would a magnifying glass.

To activate the Magnify tool, either click the Magnify button on the toolbar or click the Magnify entry on the Image Context menu.

To use the Magnify tool:

1. Activate the Magnify tool.
2. Place the cursor over the image.
3. Hold down the left mouse button. Observe the pop-up magnifying window.
4. Move the mouse around over the image and the magnifying window will follow your movements.
5. Release the left mouse button and the magnifying window will disappear.

Invert

the Invert toolbar button

Use this tool to invert the black and white pixel data, giving the image a “negative” appearance.

To use this tool, simply click the Invert button on the toolbar or click the Invert entry on the Image Context menu. The selected image will invert. To restore the image, simply click the Invert button again.

Invert all images in a series

☼ Invert all images in the series.

Note that if the “Share single frame properties” button is enabled, inverting one image will also invert all other images in the same series. To enable or disable this behavior, click the “Share single frame properties” button.

True Size (1:1)

the True Size toolbar button

☼ "True Size" refers to the actual size needed to display every physical pixel stored in the image data. MR images will typically "shrink", while larger images like CT and CR will expand.

Use this tool to display the image in its true size, i.e., 1-to-1 ratio. When in 1:1 mode, you can view every pixel that makes up the image.

To use the True Size tool, simply click the True Size button on the toolbar or click the True Size entry on the Image Context menu.

Note that the image may be too large for the viewing window, especially if you are viewing in multiple columns. In this case, you may wish to change the number of columns (see 156), use the Zoom tool to zoom the image out, or use the Fit To Window tool.

True Size all images in a series

☼ "True Size" all images in the series.

Note that if the "Share single frame properties" button is enabled, clicking the True Size tool will affect all images in the same series. To enable or disable this behavior, click the "Share single frame properties" button.

Fit To Window

☼ "Fit to Window" is the logical opposite of "True Size" (previous page.)

the Fit To Window toolbar button

Use this tool to expand or shrink an image so that it fits in the image viewing window.

This tool is of assistance when viewing large images in multiple columns as it shrinks images to fit in these smaller windows and allows you to view the whole image at once.

☼ "Fit to Window" is helpful for restoring images which have been hidden by overusing the "Pan" tool.

To use this tool, simply click the Fit To Window button on the toolbar, or click the Fit To Window entry on the Image Context menu.

Fit all images in a series

☼ "Fit to Window" all images in the series.

Note that if the "Share single frame properties" button is enabled, clicking the Fit To Window tool will affect all images in the same series. To enable or disable this behavior, click the "Share single frame properties" button.

Unsharp Masking

☼ Unsharp Masking works best on CR images.

Unsharp Masking is a technique which processes an image into a clearer and more defined image. In general, sharp parts of an image are sharpened and less defined areas become clearer. It is a better technique than simple sharpening because the results are much less harsh than a simple sharpen would produce.

Unsharp Masking is most effective on large, CR images, such as those acquired from an Orex PcCR scanner.

To use the Unsharp Masking tool:

1. Place mouse cursor over the image.
2. Click the right mouse button to bring up the Image Context menu.
3. Click (with left mouse button) the “Unsharp Mask” entry.
4. Click (with left mouse button) the percentage you would like to use. Higher values will unsharp mask the image more, but may result in a harsh image.
5. Wait a moment for the system to process the image.

To “undo” the effects of unsharp masking and return the image to its original state, use the Unsharp Masking tool again but choose “Reset” from the percentage menu.

☼ The “Share Single-Frame Properties” button does not affect Unsharp Masking. Thus, you cannot Unsharp Mask an entire series at once.

Gamma Correction

the Gamma Correction toolbar button

☼ Generally, you will find the.Width and Center tool more useful. (page 63)

This tool uses gamma correction by locating the midpoint gray values and softening extremely light and dark tones in an image.

To activate the Gamma Correction tool either click the Gamma Correction button on the toolbar or click the Gamma Correction entry on the Image Context menu.

To use this tool:

1. Place mouse cursor over the image.
2. Activate the Gamma Correction tool.
3. Hold down the left mouse button and move the mouse up or down to adjust the Gamma Correction.
4. When satisfied with the image, release the left mouse button.

Gamma Correct all images in a series

☼ Gamma Correct all images in the series.

Note that if the “Share single frame properties” button is enabled, using the Gamma Correction tool will affect all images in the same series. To enable or disable this behavior, click the “Share single frame properties” button.

Contrast

☼ The Contrast menu operations work by adjusting the width and center values for you.

Right-click on an image and choose “Contrast” for three Contrast operations:

Original contrast : click this to reset the width and center values present when the exam was opened.

Auto contrast : click this to perform an auto width & center adjustment.

Reset contrast : click this to reset the width and center values to those present when the exam was validated. Often this value will be the same as the “original contrast” option above.

Annotations : Introduction

Annotation buttons

☼ Annotations are a great aid for teaching files as well for your own later reference.

Be sure to use the Save Annotations button (see this page.).

Annotating in Professional Workstation consists of adding text and graphical objects to enhance or isolate regions of interest within an image.

Annotations do not permanently alter the image; rather they are stored separately from the image data, and are held in a transparent layer atop the image. (Think of a transparency sheet with writing laid over a picture.) Thus it is not possible for annotations to damage the original image data, and they can be hidden at any time to allow full analysis of the image.

All of the annotation tools described over the next several pages have easy, one-click toolbar buttons to activate them. They are also available from the Image Context menu (right-click on any image, choose “Annotate”), and additionally can be found by navigating the menus in the menu bar.

Each topic below names an image annotation tool, lists the ways to activate it (toolbar button, menu entry, etc.), and explores its usage.

Save your Annotations!

One of the most important reminders is to save your annotations.

After you have annotated images in a study, be sure to save those annotations! This is accomplished simply by clicking the “Save Annotations to Database” button shown here. The button is found on the Annotations toolbar.

Annotation : Line

the Line tool button

This tool creates a straight line on the image.

To use this tool, click the Line tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on an area of the image to set the line's first endpoint.
2. Move the mouse pointer to where the second endpoint will be (notice that a preview of the line is drawn while you move the mouse).
3. (left-)Click on an area of the image to set the line's second endpoint.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing "Delete All Annotations" from this menu.

Annotation : Ellipse

the Ellipse tool button

This tool creates a (hollow) ellipse on the image. This is often used to circle an ROI (region of interest).

To use this tool, click the Ellipse tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on an area of the image to start the ellipse.
2. Move the mouse pointer and observe the ellipse expanding. Move the mouse such that the ellipse will enclose the ROI.
3. (left-)Click to set the ellipse in place.

Regarding the initial click: it is generally best to click a spot that is above and left of the ROI, as you will then drag the ellipse down and to the right to enclose the ROI. It generally takes a few practice ellipses to master the technique.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing “Delete All Annotations” from this menu.

Annotation : Box

the Box tool button

This tool creates a (hollow) box on the image. You can create a square or a rectangle of any ratio (tall, long, etc.) and is often used to indicate an ROI (region of interest).

To use this tool, click the Box tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on an area of the image to start the box.
2. Move the mouse pointer and observe the box expanding.
3. (left-)Click again to set the box.

Regarding the box drawing technique: your first click will set a corner of the box in place. Generally, make your first click above and left of the ROI. This will set the top left corner of the box. You then move the mouse down and right to draw the box and enclose the ROI.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing “Delete All Annotations” from this menu.

Annotation : Arrow

the Arrow tool button

This tool creates an arrow (or “pointer”) which will point at an area of the image.

To use this tool, click the Arrow tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click the mouse on an area of the image to set the pointer end of the arrow.
2. Move the mouse and observe the trailing end of the arrow following your movements. You can rotate the arrow around and shorten or lengthen the trailing end.
3. (left-)Click the mouse to set the other endpoint of the arrow.

Regarding the arrow drawing technique: your first click sets the arrowhead, so you should click on or very near the area that you wish to point to. The trailing line should be made whatever length you feel is appropriate and can be rotated so that the arrow is out of the way of other ROI or other annotations.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing “Delete All Annotations” from this menu.

Annotation : Freehand

the Freehand tool button

This tool is used to draw freehand on the image. With the tool you are able to draw any shape or figure that you desire.

To use this tool, click the Freehand tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. Move the mouse over the image to where you would like to start drawing.
2. Hold down the left mouse button (the mouse pointer changes to hand) and drag the mouse. As you move the mouse, the drawing will mimic your movements.
3. Continue to draw as necessary.
4. Release the left mouse button to end the freehand drawing.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing “Delete All Annotations” from this menu.

Annotation : Text

the Text tool button

This tool allows you to place typed text on the image. Many doctors use this in conjunction with other tools, such as the arrow or ellipse, to explain the ROI or indicate opinions / readings.

To use this tool, click the Text tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on an area of the image to set the upper left corner of the textbox.
2. Move the mouse downward and to the right to set the size of the textbox.
3. (left-)Click to set the textbox's size.
4. The area you have boxed off now turns white and a flashing cursor appears in the top left part of the textbox. At this point you should type your text with the keyboard.
5. When you are done typing, press the Enter key on the keyboard.

Notes on the text tool: the initial setup of the tool has you create a "textbox", simply a rectangular area in which your text will be placed. The borders of this textbox do not appear once you have typed the text.

Note that the text will only appear as wide as the textbox you set up, thus you are effectively setting the size of the "page" on which the text appears. Be sure to create a textbox large enough to hold all that you wish to say.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing "Delete All Annotations" from this menu.

Annotation : Measure

the Measure tool button

This tool is used to measure straight-line distance (in millimeters) of an area in the image.

To use this tool, click the Measure tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on the image to set the first end point of the ruler.
2. Move the mouse and observe that the line being draw follows your movement. Move the mouse to where the end point of the measurement will be.
3. (left-)Click to set the end point. Observe the measurement that appears.
4. At this point, you have the option of moving the drawn line and measurement out of the way. Move the mouse up or down (for horizontal measurements) or side to side (vertical measurements) and note that the text will move with you.
5. (left-)Click a final time to set the placement of the text.

Note that the ability to move the position of the measurement text allows you to leave the measured area uncovered and in full view.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing “Delete All Annotations” from this menu.

Annotation : Angle

the Angle tool button

This tool is used to draw an angle and display the measurement of that angle.

To use this tool, click the Angle tool button on the Annotations toolbar (or choose the tool from the Annotations context menu) and:

1. (left-)Click on the image to set the vertex (center point) of the angle.
2. Move the mouse and notice the drawn line which follows your movements.
3. (left-)Click to set the endpoint of the first vector.
4. Move the mouse and notice the second drawn line which follows your movements.
5. (left-)Click to set the end endpoint of the second vector.
6. At this point, the angle's measurement is displayed and you have the option of moving the text out of the way. Move the mouse and observe the measurement text moving with you.
7. (left-)Click a final time to set the position of the text.

Note that the ability to move the position of the measurement text allows you to leave the measured area uncovered and in full view.

The easiest way to quickly remove the annotation is to right-click the image (which displays the image context menu) and choosing "Delete All Annotations" from this menu.

Annotate : Delete All Annotations

This is only available from the image context menu (right-click the image with annotations you wish to delete.)

This tool provides a quick method of removing annotations. It is useful, for example, when you simply want to take a quick measurement and then remove the measurement from view.

To use the tool, right-click the image with annotations and select “Delete All Annotations” from the menu.

Note about Saved Annotations:
Note that if you previously saved the annotations (using the Save Annotations to Database” button), this tool will not remove them from the database, only temporarily remove them from the image. If you close and reopen the study, the annotations will reappear. If you mean to permanently delete the annotations, you should click the “Save Annotations to Database” button after using this tool.

Annotations : Editing and Deleting

Professional Workstation includes the ability to edit and delete previously created annotations. To perform either of these operations, you must be in "Annotation Mode," accomplished by clicking the appropriate toolbar button or choosing "Enter Annotation Mode" from the Image context menu.

When in "Annotation Mode", right-clicking an image will result in the Annotation context menu being displayed instead of the usual Image context menu.

Selecting Annotations

You must first select an annotation before you can edit or delete it.

1. Enter Annotation Mode (explained above)
2. Move the mouse over an annotation and observe that the mouse pointer changes to a pointing hand. Also observe the annotation will light up.
3. (left-)Click the annotation to select it. It will change colors and several little filled boxes (called "handles") will appear on the annotation.

The annotation is now selected.

A shortcut to selecting all of the annotations on the image: right-click and choose "Select All" from the Annotations context menu.

Editing Annotations

To edit an annotation, you must first select the annotation. See “Selecting Annotations” on page 84 for an explanation of selecting annotations.

Once selected, the editing process depends on the type of annotation.

Arrow: Click and drag either endpoint to adjust the position of the arrow.

Line: Click and drag either endpoint to adjust the position of the line.

Ellipse: Click and drag one of the four “handles” to adjust the size, shape, and position of the ellipse.

Box: Click and drag one of the six “handles” to adjust the size, shape, and position of the box.

Measure (ruler): Click and drag either endpoint to adjust the measurement. Click and drag the measurement text to move it out of the way.

Angle: Click and drag a “handle” to adjust the vertex or one of the vectors. Click and drag the measurement text to move it out of the way.

Textbox: Click and drag one of the six “handles” to change the size, shape, and position of the textbox. Click inside the textbox to bring up the white editing window and use the keyboard to edit or add to the text.

Deleting Annotations

To delete an annotation, you must first select the annotation. See “Selecting Annotations” on page 84 for an explanation of selecting annotations.

Once selected, you can simply press the “Delete” key (sometimes labeled “Del”) on your keyboard to delete the annotation. Or, you can right-click the annotation and choose “Delete” from the Annotations context menu.

Note that if you have multiple annotations selected, each one will be deleted in this single step.

Chapter 6

Advanced Viewing Operations

This chapter explores some of the more advanced viewing features found in the Onyx-RAD Professional Workstation.

Chapter Contents

Key Images : An Overview 90
Marking Key Images 90
Reading Key Images 91
DICOM Elements (“Tags”) 92
Histogram 93
Compare Mode (Compare Series in One Study) 95
Comparing Multiple Studies 96
ROI Tool 97
Patient / Study Merge 99

Key Images : an Overview

The "Key Images" feature of Onyx-RAD Professional Workstation is designed to allow the quick identification of particularly important images in a study. The doctor reading the exam marks images as "key" that (s)he feels are prominent in the study. A copy of each of these images is then placed in a separate series (image stack) so that all of the key images in the study can be viewed quickly in sequence. Additionally, the image is marked with a special icon to identify it as a key image.

☼ Key images are marked with this icon in the upper left corner of the image:

The power of this tool is that the next doctor who reads the exam can concentrate on this new stack of key images and render a reading very quickly. Another advantage is that, although the key images may reside in many separate series, the new key image stack brings all of these images together into one stack, providing a more efficient read.

Marking Key Images

Marking images as "key" is simple. Simply select the image (in one column viewing the visible image is automatically selected; in multiple column viewing the selected image has a thicker red border) and press the "K" key on the keyboard.

Other methods: click the Key Image button on the toolbar, or click the Key Image menu entry on the Image Context (pop-up) Menu.

To unmark a key image, (i.e., remove its "key" status), simply key it again and its key status will toggle off.

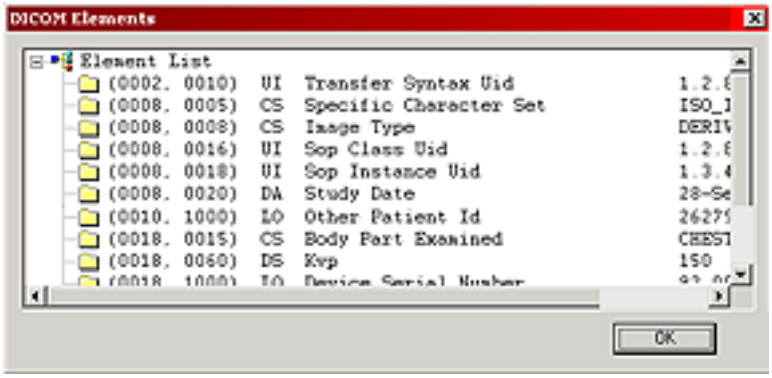
Reading Key Images

Images that have been marked as key images will appear in their respective series (as normal), but the image will be marked with a special icon to indicate its “key” status:

Additionally, all key images in the study will appear in a separate series to allow for quick viewing of all key images. This series is always the last one in the Series/Stacks window, and has a thick border. (On a color monitor the border is purple.)

DICOM Elements (“Tags”)

To view the DICOM tag data for a particular study or image, simply right-click the study (in the Study Listing screen) or image (in the Image Viewing screen) and choose “DICOM Elements” from the pop-up menu. The DICOM tags are displayed in a new window.

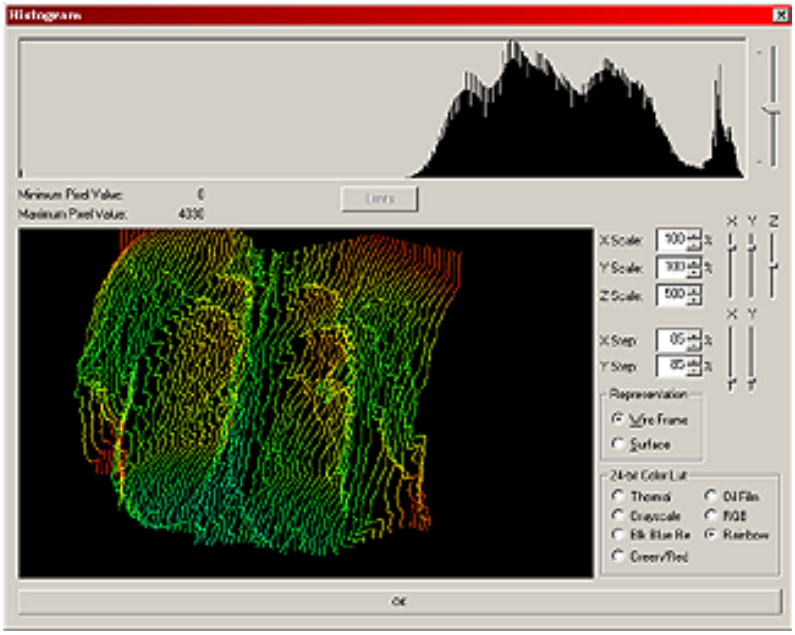

DICOM Elements
Element List
(0002, 0010) UI Transfer Syntax Uid
(0008, 0005) CS Specific Character Set
(0008, 0008) CS Image Type
(0008, 0016) UI Sop Class Uid
(0008, 0018) UI Sop Instance Uid
(0008, 0020) DA Study Date
(0010, 1000) LO Other Patient Id
(0018, 0015) CS Body Part Examined
(0018, 0060) DS Kvp
OK

This tool is provided for those times that you or a technologist may need access to this data. To exit this window, click the “OK” button in the bottom right corner of the window.

Histogram

Sometimes it is helpful to have an idea of how the pixel values fall for a particular image. Such information may be useful in calibrating a scanner or troubleshooting the quality of an image from another institution.

To view a three-dimensional histogram for an image in the Image Viewing screen, simply right-click the image and choose “Histogram” from the pop-up menu.



The screenshot above shows a sample histogram.

To rotate the 3-D model, click and hold the left mouse button and drag the model.

To pan the model around, right-click the model to bring up a menu, and choose Pan from the menu. Then drag with the left mouse button to pan the model around.

To Zoom the model in or out, right-click the model to bring up a menu, and choose Zoom from the menu. Then drag up or down with the left mouse button to zoom in or out, respectively.

A two-dimensional graph is also provided (upper portion of the window), and the data can be skewed exponentially with the by dragging the slider bar up or down.

Adjust other parameters, such as the X, Y, and Z scales, by dragging the appropriate slider bars up or down.

There are also several radio buttons to change the color and appearance of the model.

To exit the histogram, click the long “OK” button at the bottom of the window.

Compare Mode (Compare Series in One Study)

Often it is useful to compare two series side-by-side. While this is easily accomplished (and often automatic) on a workstation with multiple monitors, Compare Mode must be used when only one monitor is present.

To enter Compare Mode:

1. Click the first series thumbnail in the Series Window. The series should become active (its images will appear in the Image Window) and it will be shown with a red border, indicating it is active and selected.

2. Select the second series by holding the Control ("Ctrl") key on the keyboard and click the second series, then release the Control key. You should notice that both the first and second series have red borders now, indicating that both are selected.

3. Enter Compare Mode by clicking either the Vertical Compare Mode or Horizontal Compare Mode toolbar button.

Vertical Compare Mode

Horizontal Compare Mode

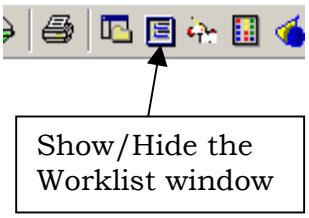
The Image Window splits in half with one series on each side. You can cause both windows to scroll together (i.e., as you progress through one series the other moves with it) by clicking the "Compare Scroll" button:

Compare Scroll

Comparing Multiple Studies

Often it is helpful to view multiple studies at once, e.g. to compare original and follow-up exams. Onyx-RAD features many tools and options for view multiple studies at once. Over the next few pages we will explore how to open multiple studies, control how the images are laid out across the display(s), compare mode, linked scrolling, and other features.

Multiple Studies – Opening



To open multiple studies:

1. Open the first study in the normal way, selecting it from the Study List.
2. Once all of the images for the study have loaded, click the “worklist window” button to show a miniature study list.
3. Find the next study in the list and open it by double-clicking (same way you normally open a study.)
4. Continue to open other exams by repeating step 3.
5. Finally, to reclaim maximum image viewing space, close the worklist window by clicking the “worklist window” button again.

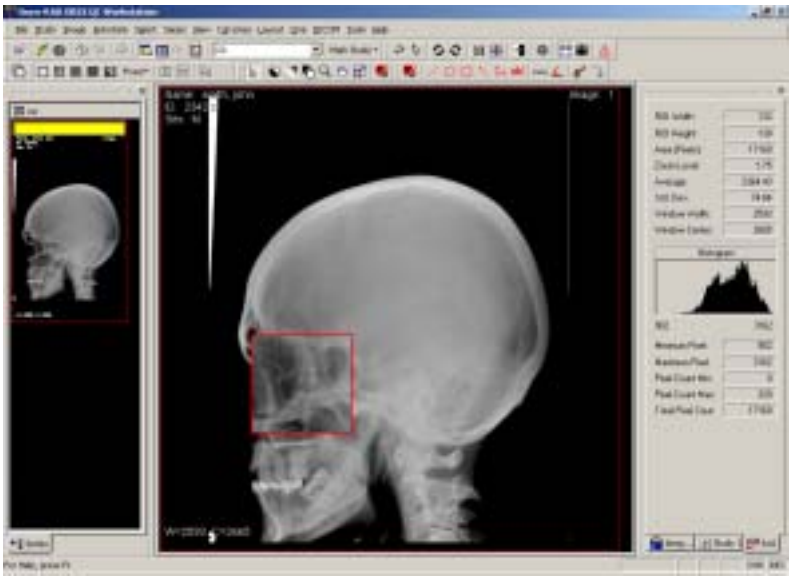
ROI Tool

The ROI tool is used for viewing Hounsfield units.

☼ The ROI tool is used to observe Hounsfield units.

To initiate this tool, right-click on an image and choose “ROI” from the popup menu. The mouse cursor changes to the ROI cursor, and the right side of the screen displays a wealth of information related to the Hounsfield unit, pixel distribution, etc.

To use the tool, hold down the left mouse button and move the red box around the image. Observe the data on the right side of the screen, including “Average”, to determine the Hounsfield units of the area in the box.



To increase or decrease the size of the ROI box:
Hold down the CTRL key on the keyboard.
Hold down the left mouse button and move the mouse left and right to change width of the box, up and down to change height.
Release the CTRL key on the keyboard to set the size.

To zoom in or out within the ROI box:
Hold down the SHIFT key on the keyboard.
Hold down the left mouse button and move the mouse up and down to change the zoom (up zooms in, down zooms out.)
Release the SHIFT key on the keyboard to set the Zoom.

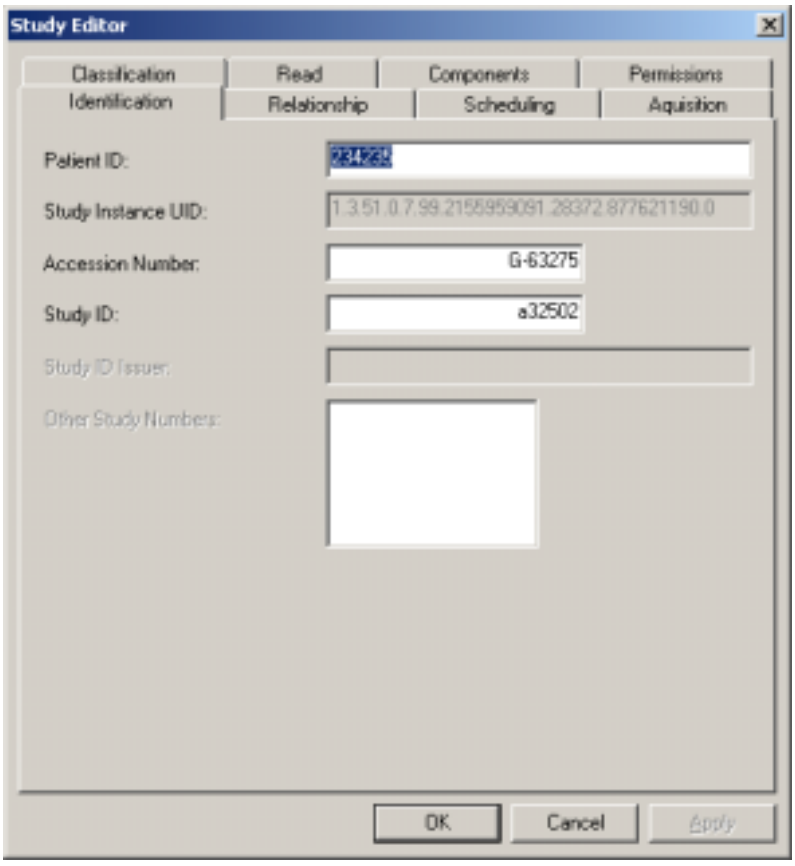
Patient / Study Merge

This is useful when a mistake has been made in entering a patient id, and it is necessary to “merge” two patient ids into one. For example:

John Smith is entered the system with patient id 1234. Sometime in the future the same John Smith is entered into the system with patient id 1235 (a mistake.) A merge is necessary to tell the system that these two are really the same patient, and set them both to patient id 1234.

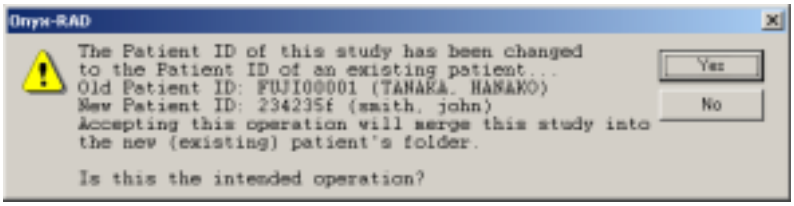
To use the merge, locate the study in the Study List which has the incorrect patient id (thus it’s the study you’re going to change.) Right-click the study and choose “Edit” from the popup menu, then choose “Study” from the side menu.

(screen shot on next page.)



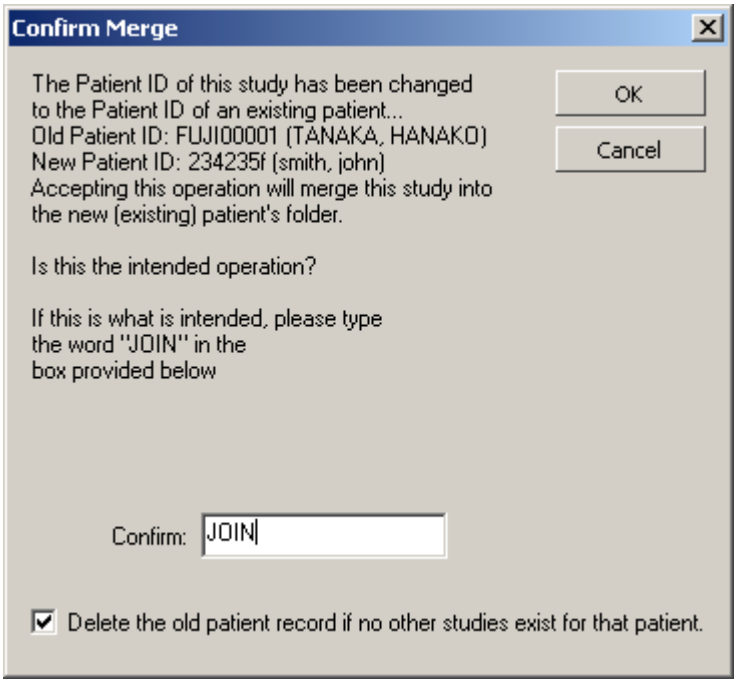
In the Edit Study dialog, click on the “Identification” tab. Change the Patient ID to the correct value and click “Apply” at the bottom of the dialog.

A rather serious warning message appears, advising you that you are indeed merging two patients. Review the message and the Patient IDs to be sure, then click “Yes.”


Onyx-RAD
The Patient ID of this study has been changed
to the Patient ID of an existing patient...
Old Patient ID: FUJI00001 (TANAKA, HANAKO)
New Patient ID: 234235f (smith, john)
Accepting this operation will merge this study into
the new (existing) patient's folder.
Is this the intended operation?
Yes
No

☼ Merging patients is a delicate operation for which you want to be sure you have specified the correct patient IDs. For this reason, Onyx-RAD asks you to confirm your intentions twice.

After clicking Yes, a final confirmation dialog appears:


Confirm Merge
The Patient ID of this study has been changed to the Patient ID of an existing patient...
Old Patient ID: FUJI00001 (TANAKA, HANAKO)
New Patient ID: 234235f (smith, john)
Accepting this operation will merge this study into the new (existing) patient's folder.
Is this the intended operation?
If this is what is intended, please type the word "JOIN" in the box provided below
OK
Cancel
Confirm: JOIN
Delete the old patient record if no other studies exist for that patient.

The dialog instructs you to type in “JOIN” and click OK to continue. Again, review the old and new Patient IDs before proceeding. After you click OK, the patients will be merged and both studies will indicate the proper patient ID.

Chapter 7

Printing (Paper and Film)

This chapter covers printing in Professional Workstation. Topics include using the Image Bucket to select individual images for printing, the Print window and its options, and printer selection.

Paper and Film printing are covered.

Chapter Contents

Printing Overview....104
The Image Bucket....106
Drag Individual Images to the Image Bucket....106
Drag a Complete Series to the Image Bucket....106
Print to Paper....107
Print to Film....107
Clear the Image Bucket....111
Adding DICOM Printers....112
Configuring DICOM Printers....113
Removing DICOM Printers....119

Printing Overview

Onyx-RAD Professional Workstation offers the ability to print to film as well as paper, specifying the number and layout of images printed, overlay printing, and other options.

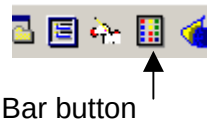
Your printing capabilities depend on the type of printers installed at your site. Paper printing can utilize virtually any normal office printer (though Laser quality is recommended). Film printing, however, is only possible with special printers.

The general technique for either kind of printing (paper or film) is:

1. Drag the desired images (or series) to the Image Bucket.
2. Click the appropriate print button.

The Image Bucket

The Image Bucket is a narrow window which resides on the right-hand side of the Image Viewer Screen. Like most other parts of the Workstation screens, this window can be turned on or off as needed. If the Image Bucket is not currently displayed, simply click the Stats Bar ("Config Bar") icon on the Standard Toolbar.



Config Bar button

The Image Bucket shares space with the Stats Bar, so you may need to click the "Image Bucket" tab at the bottom of the window to switch between the two.

The Image Bucket acts as a space to hold selected images for printing until you are ready to print. You can manipulate images (window and level, zoom, annotate, etc.) as you like and then drag the image to the Image Bucket for holding while you work on other images.

When you are ready to print, clicking one of the two print buttons (paper or film) will process only the images in the Image Bucket.

Drag Individual Images to the Image Bucket

To select individual images for printing, you must drag them into the Image Bucket.

You should first perform any desired manipulation (window and level, zoom, annotate, etc.). To drag the image, ensure that no view tools are selected such as pan or zoom. If one of these tools is selected, your mouse cursor will reflect it – e.g. a magnifying glass for Zoom, or a hand for Pan. Turn the tool off to return your mouse cursor to a cross hair.

Now you can drag images. With the left-mouse button, click the image and hold the mouse button down while dragging the image over to the Image Bucket window. Release the button and observe that a copy of the image is now in the Image Bucket.

Drag a Complete Series to the Image Bucket

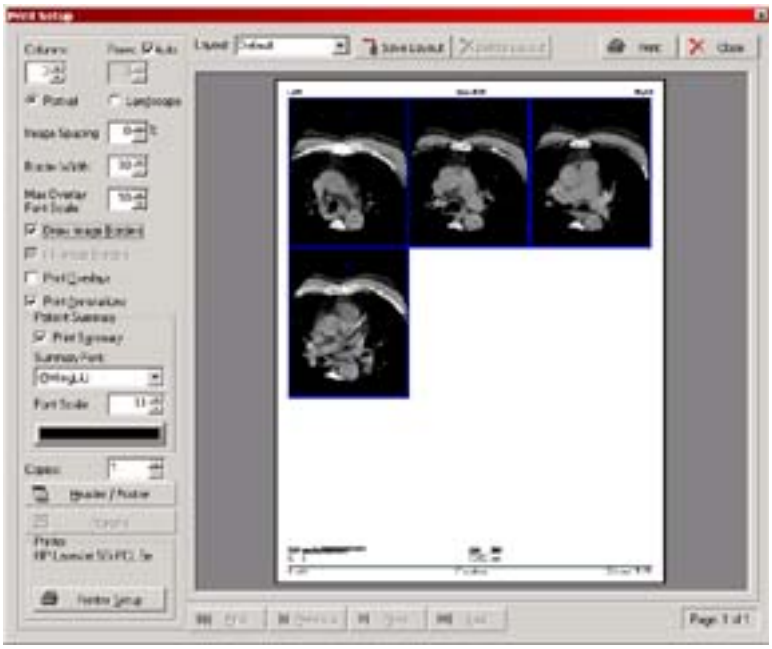
You may desire to print an entire series. Rather than dragging the series' images individually, you may drag the whole series from the Series/Stack window to the Image Bucket window.

Mouse your mouse cursor to the Series/Stacks window and ensure that "Span Images" is not enabled. (Your mouse cursor will show "span" if this tool is on. Click the Span Images toolbar button to turn this off.) Drag the series thumbnail to the Image Bucket window in the same manner as you drag individual images.

Print to Paper

At the bottom of the Image Bucket window are the print buttons:

Click the “Print” button to bring up the Paper Print window, seen below:



This window offers many options for defining the layout of the printed page, and a preview of what the printout will look like. In this window it is possible to control:

- Number of columns and rows to print images in
- Orientation of the paper (portrait / landscape)

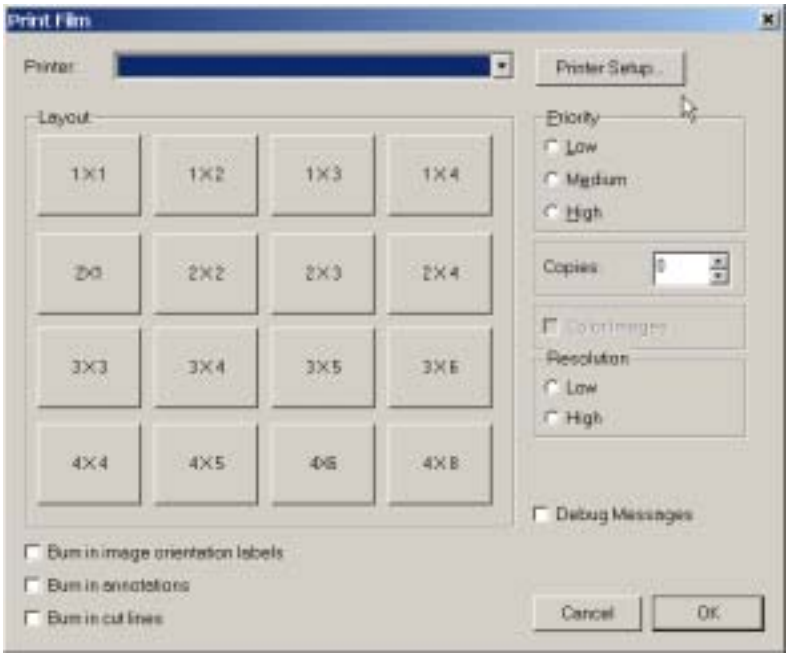
- Margins
- Spacing between images
- Width of border around images
- Overlay printing
- Patient summary
- Header and footer text, which can contain anything (common usage is institution information and page numbers)

To change any of these options, simply locate the appropriate checkbox or button on the window and click. Once the page is set up as desired, click the Print button in the top right of the window and your images will be sent to the selected printer.

Print to Film

After selecting the images or series to print (by dragging to the Image Bucket, see previous section), it's time to print.

Click the DICOM Print button and the DICOM print dialog appears.



Select the DICOM printer from the list box at the top of the dialog (the printer that was used last is already selected.)

Choose a layout for the printed images by clicking any one of the layout buttons. The supported layouts include common configurations such as "4 X 4", indicating 4 columns by 4 rows.

After choosing the layout, check the other options available on the dialog such as print job priority (higher priority jobs are completed before lower priority jobs), resolution (higher

resolution provides crisp, clear images), and number of copies desired.

Other options available:

Burn in image orientation labels: Select this option to "burn in" the orientation markers (e.g., "L" and "R" markers) into the images so that they print to film.

Burn in annotations: Select this option to "burn in" any annotations you've made (including markers, text, and measurements) so that they print to film.

Burn in cut-lines: Select this option to "burn in" any cut-line appearing on the image so that they print to film.

Finally, click the Print button to send the print job to the DICOM printer.

The "Debug Messages" checkbox

A final option on the DICOM print dialog is the Debug Messages checkbox. Click to enable or disable this option. If enabled, every step of the DICOM print job will pause and present you with a list of the DICOM elements involved in that stage of printing. You will see details of the print job request creation, submission, film box creation, and responses. This is useful for troubleshooting a DICOM printer, but generally not desirable for everyday operation, as each popup message that occurs must be dismissed (click "OK") before the print job continues.

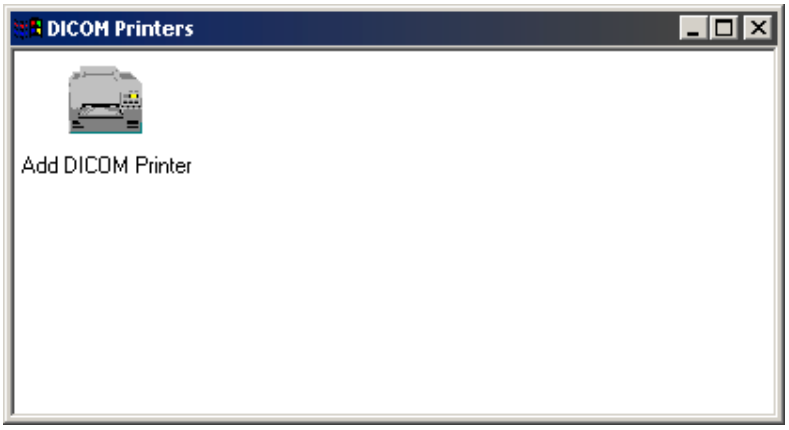
Clear the Image Bucket

After printing (or if you decide to cancel) you should clear the images from the Image Bucket. Click the “Clear” button near the bottom of the Image Bucket window to remove all images from the Image Bucket.

Adding DICOM Printers

Before you can print to a DICOM Printer (“camera”), it must be configured in your Onyx-RAD software. Fortunately, this is a simple task.

From the DICOM menu, select Printer Setup. A window appears with an icon title “Add Printer”, as well as icons for any DICOM printers you may already have access to.



To add a printer, double-click the “Add Printer” icon. There are many options you can set for the printer, but at the very least you must give it a description. See the next topic, “Configuring DICOM Printers”, for details on the available configuration options.

When you have finished adding your printer, click OK. Then close the DICOM Printers window by clicking its top-right “X” button.

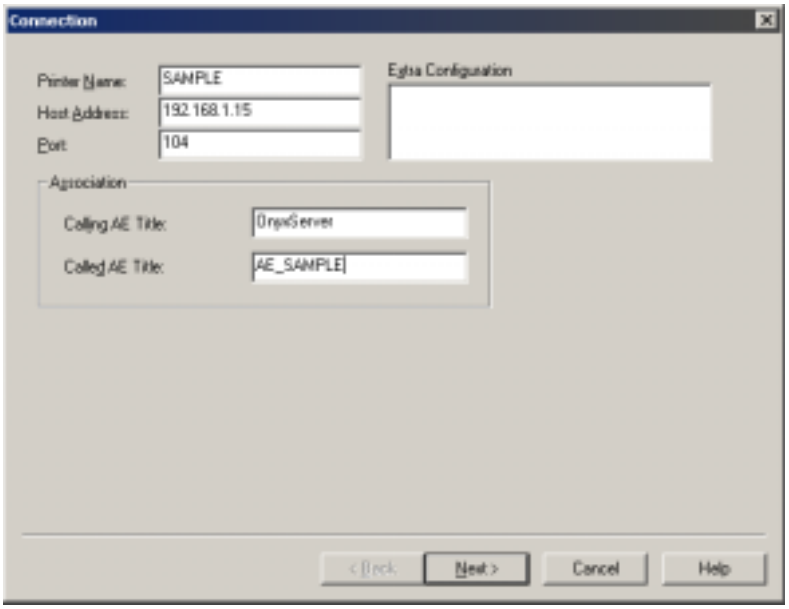
Configuring DICOM Printers

DICOM Printers come from many manufacturers, and although most of them offer standard features, you may desire to tweak the configuration of your printer to get the best results.

To configure an existing DICOM printer, select “Printer Setup” from the DICOM menu bar, then double-click the desired printer from the next window.

The configuration dialogs are shown on the next few pages.

The first configuration screen is shown below:



Printer Name: Enter a friendly name for this printer.

Host Address: Enter the network address for this printer.

Port: Enter the required port number for this printer.

Extra Configuration: Enter any other parameters as directed by the printer manufacturer or an Onyx-RAD technician.

Calling AE Title: Enter “OnyxServer” (or whatever AE Title has been set up for the printer to accept jobs from.)

Called AE Title: Enter the printer’s AE Title.

Click the “Next” button to proceed to the next configuration dialog.

The second configuration dialog is shown below:

Print Overlays: Enable this checkbox to send overlays (the tags that appear in the corners of images, such as Patient Name, Study Date, image number, etc.)

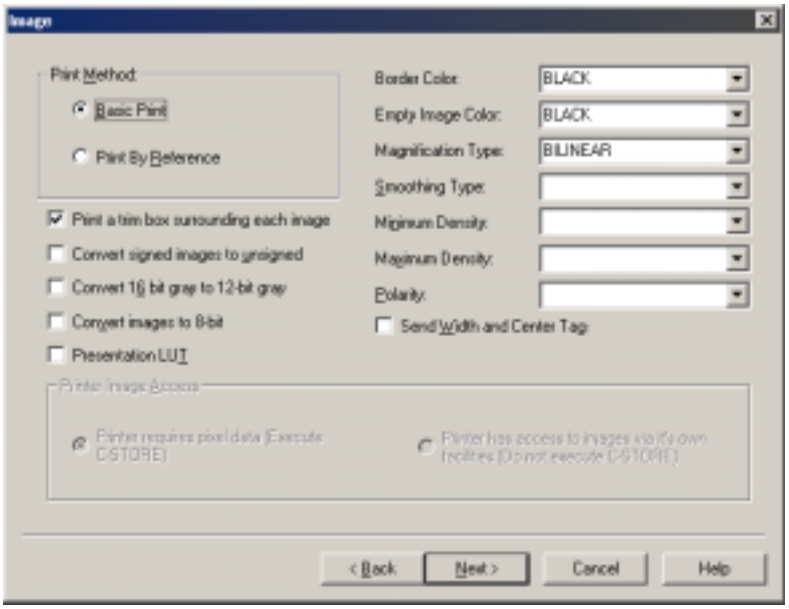
Printer Overlay Support: If the printer supports overlays, select the *Printer Supports Overlays* option.
If overlays do not print, it may be that the printer does not support overlays. It is thus necessary to "burn in" the overlays, which you can do by selecting the *Burn In Overlays Before Printing* option.

More Overlay Options: Select either the *Printer Supports Overlays Storage* (the most common) or *Send Overlay tags in Image Data* option according to your printer's capabilities.

Overlay Magnification Type: Select the appropriate magnification type for overlay printing. (BILINEAR is most common.)

Click the "Next" button to proceed to the next configuration dialog.

The third configuration dialog is shown below:



Print Method: choose this based on your printer's capabilities. *Basic Print* is the most common, while *Print By Reference* will enable further options at the bottom of the window ("execute CSTORE" and "do not execute CSTORE").

Print a trim box surrounding each image: Print a white border surrounding each image. This is commonly enabled.

Convert signed images to unsigned: This will convert signed pixel data to unsigned pixel data. Some printers require this.

Convert 16-bit gray to 12-bit gray: required by some printers. This also often helps to lighten up images.

Convert images to 8-bit: required by some printers. This also often helps to lighten up images which are printing too dark.

Presentation LUT: Some printers support a LUT (lookup table) that greatly enhances the appearance of printed images.

Border Color: border color surrounding each image (this is independent of the white Trim box option mentioned earlier.)

Empty Image Color: Empty image boxes on the printed film will fill with this color.

Magnification Type: Select this based on what your printer supports.

Smoothing Type: Select this based on what your printer supports.

Minimum Density: Select this based on what your printer supports.

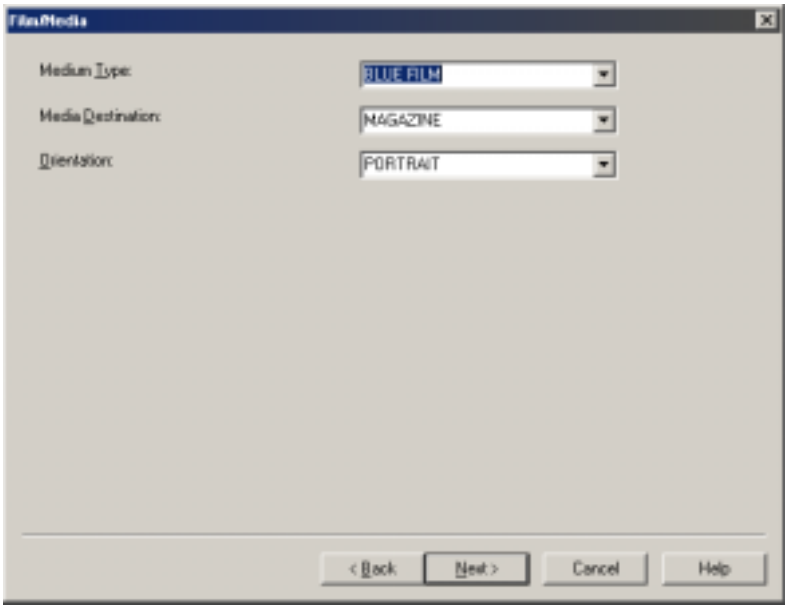
Maximum Density: Select this based on what your printer supports.

Polarity: Select this based on what your printer supports.

Send Width and Center tag: If the printer supports the DICOM pixel width and center tags (contrast), select this option.

Click the “Next” button to proceed to the next configuration dialog.

The fourth configuration screen is shown below:



Medium Type: Select this based on the media you are using (BLUE FILM, CLEAR FILM, etc.)

Media Destination: Select this based on the printer.

Orientation: Select whether to print the images “portrait” oriented or “landscape”.

Click “Next” to proceed.

Click “Finish” to complete the DICOM printer setup.

Removing DICOM Printers

Should you wish to remove a DICOM printer from your system, you must first open the list of available DICOM printers. From the DICOM menu, click “Printer setup.” A window appears listing all of the available printers. Simply click the printer you wish to delete, then press the “delete” key (it may be labeled “del”) on your keyboard to delete the printer.

Chapter 8

CD Burning

This chapter explores the process of creating Patient CDs using a CD-Recordable drive (commonly referred to as a "cd burner." Onyx-RAD Professional Workstation provides the functionality of copying exams to CD in standard DICOM format for compatibility across PACS systems. This functionality is a standard feature.

Chapter Contents

Introduction to Burning CDs.....122
Creating a Patient Disc.....123
CD Burning Configuration.....126
CD Archiving.....128
Importing Exams from Archive CDs.....131

Introduction to Burning CDs

Imagine leaving the emergency room with a CD of images of your broken foot, a CD that you can insert into your home computer and view the x-rays at any time. The ability to copy an exam onto a CD and send the patient (or referring physician) home with this disc is truly a tool of the future. Onyx-RAD Professional Workstation provides this ability today.

CD "Burning" is a standard feature of Onyx-RAD Professional Workstation. All of the images in an exam can be copied to a recordable compact disc, along with a "Lite" version of the Onyx-RAD Image Viewer. The finished disc can then be viewed in any computer running Windows 98 or better. The result is a special, personalized souvenir for the patient, and a solution more cost-efficient than film for the referring physician.

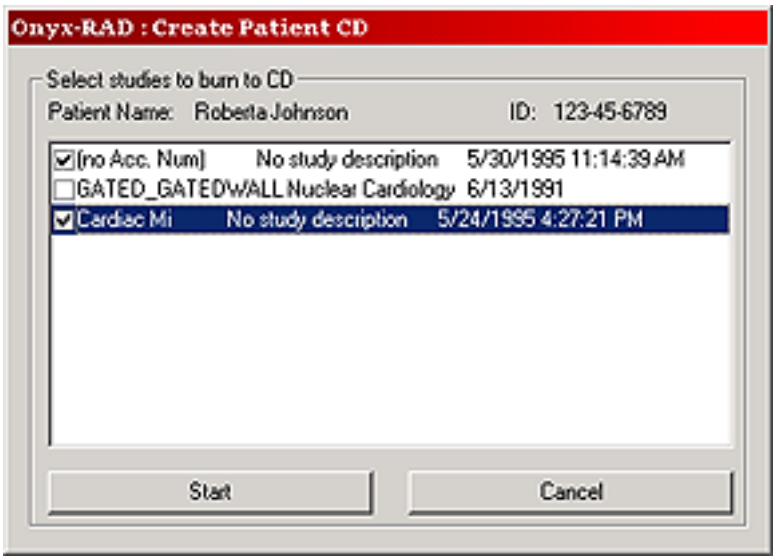
Images are stored in standard DICOM format, a medical standard ensuring that other vendors' PACS systems will be able to read the images on the disc.

Creating a Patient Disc

(Note that the workstation must have a CD-Recordable drive installed and configured. This is handled by Viztek technicians.)

Burning a CD is simple in Professional Workstation. The task is performed from the Study List screen. Simply click the desired study one time to highlight it. Right-click the study and choose “Burn Study to CD” from the menu that appears, then choose “Make Patient Disc.”

A window will appear (sample screenshot below) with a listing of all the studies for this patient, along with “Start” and “Cancel” buttons.

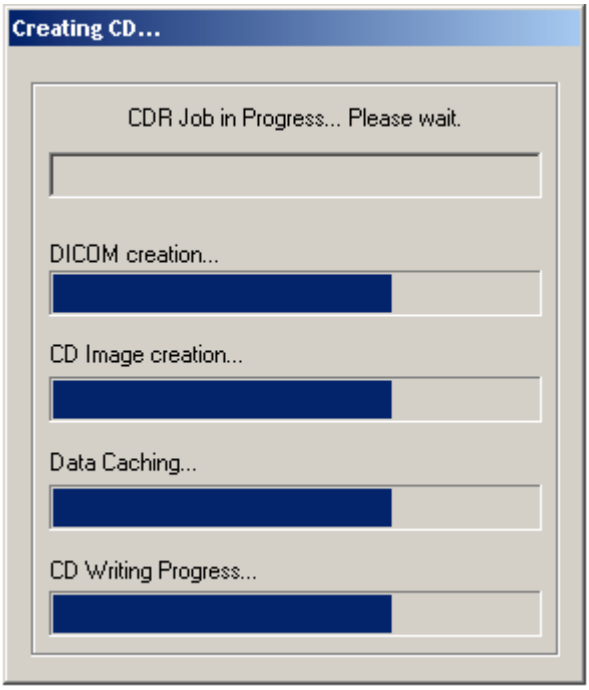

Onyx-RAD : Create Patient CD
Select studies to burn to CD
Patient Name: Roberta Johnson
ID: 123-45-6789
(no Acc. Num) No study description 5/30/1995 11:14:39 AM
GATED_GATEDWALL Nuclear Cardiology 6/13/1991
Cardiac Mi No study description 5/24/1995 4:27:21 PM
Start
Cancel

This listing allows you to choose the studies that will be burned to the disc. Select studies by clicking the checkbox for each desired study.

Now click the “Start” button to commence the burning process. Clicking the “Cancel” button will cancel the

operation and return you to the Study Selection screen.

A progress window appears and keeps you informed of the status of the cd burning:



There are four progress bars and a status bar at the top.

The status bar displays the current operation, e.g. “Writing to disc…”

The DICOM Creation progress bar tracks the progress of images being saved in standard DICOM format to a temporary folder.

The CD Image Creation progress bar tracks the progress of the ISO disc image creation.

The Data Caching progress bar tracks the progress of the system caching the data to be written to disc.

Finally, the CD Writing Progress bar tracks the progress of the actual writing to disc. When this bar fills completely, the status bar at the top will display “Closing Disc” and you are generally less than one minute away from a Patient CD!

When the job completes, a message pops up on the screen. Click the “OK” button on this message and the new Patient Disc is automatically ejected from the cd burner.

Please note that CD burning is a system-intensive process and requires all of the computer’s processing to achieve. It is therefore necessary to wait while until the CD is complete before continuing to use Professional Workstation. With current recording technology and speeds, most discs are complete within three minutes. Particularly large exams may take more time to complete.

Also note that Patient CDs can only be created one at a time in Professional Workstation.

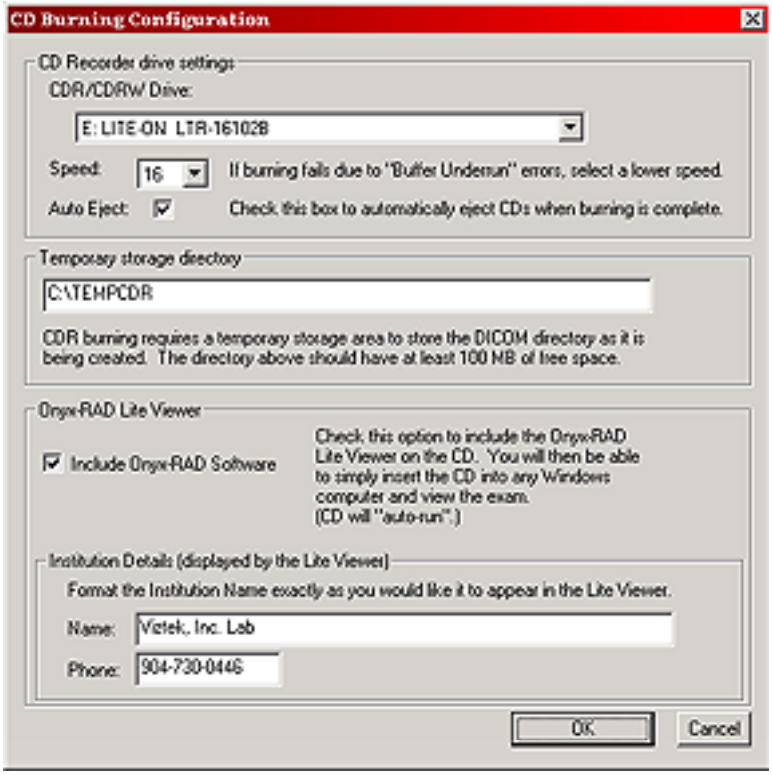
If this is not sufficient for your institution’s needs (perhaps you need to create large numbers of CDs, or cannot have your reading interrupted by the CD burning process), please consider either purchasing a separate workstation devoted to creating CDs, or purchasing an Onyx-RAD CDR Server to automate the process. (For more information please contact Viztek, Inc.)

Acquire workstations can utilize CD Archiving (explored later in this chapter) to offload exams from the local machine onto CDs for long-term storage.

CD Burning Configuration

Although Viztek technicians will install and configure the cd-recordable drive, there are a few CDR settings that are available for you to change. Below is a screenshot of the CDR Configuration window. This window will appear if you start a CDR job (like creating a Patient Disc) and the CDR settings have not already been configured.

You can also bring up this window from the File menu (click File, CDR Setup.


CD Burning Configuration
CD Recorder drive settings
CDR/CDRW Drive:
E: LITE-ON LTR-16102B
Speed:
16
If burning fails due to "Buffer Underrun" errors, select a lower speed.
Auto Eject:
Check this box to automatically eject CDs when burning is complete.
Temporary storage directory
C:\TEMPCDR
CDR burning requires a temporary storage area to store the DICOM directory as it is being created. The directory above should have at least 100 MB of free space.
Onyx-RAD Lite Viewer
Include Onyx-RAD Software
Check this option to include the Onyx-RAD Lite Viewer on the CD. You will then be able to simply insert the CD into any Windows computer and view the exam. (CD will "auto-run".)
Institution Details (displayed by the Lite Viewer)
Format the Institution Name exactly as you would like it to appear in the Lite Viewer.
Name:
Viztek, Inc. Lab
Phone:
904-730-0446
OK
Cancel

CDR/CDRW Drive : Choose your burner from this list of scanned drives. The drives are identified by vendor and model descriptions.

Speed : After selecting your drive, this box will be enabled and filled with speeds that your drive is capable of. Choose your desired burning speed from this list.

☼ CD-Recordable discs are rated for a certain write speed. You should choose a recording speed that is compatible with your discs.

Auto Eject : Click this checkbox to have the burner automatically eject discs once the recording process completes.

Temporary Storage Directory : This specifies where temporary files are stored during the burning process. It is recommended that you not change this value from the default.

Include Onyx-RAD Software : Click this checkbox to include a copy of the Onyx-RAD Lite Viewer on the disc. The disc can then be read by any computer with Windows 98 or newer.

Institution details – Name: Enter the institution name exactly as you would like to appear in the Lite Viewer.

☼ The institution details are useful for marketing purposes, as this information will appear prominently in the Lite Viewer when the patient disc is accessed in another computer.

Institution details – Phone: Enter the institution phone number as it will appear in the Lite viewer.

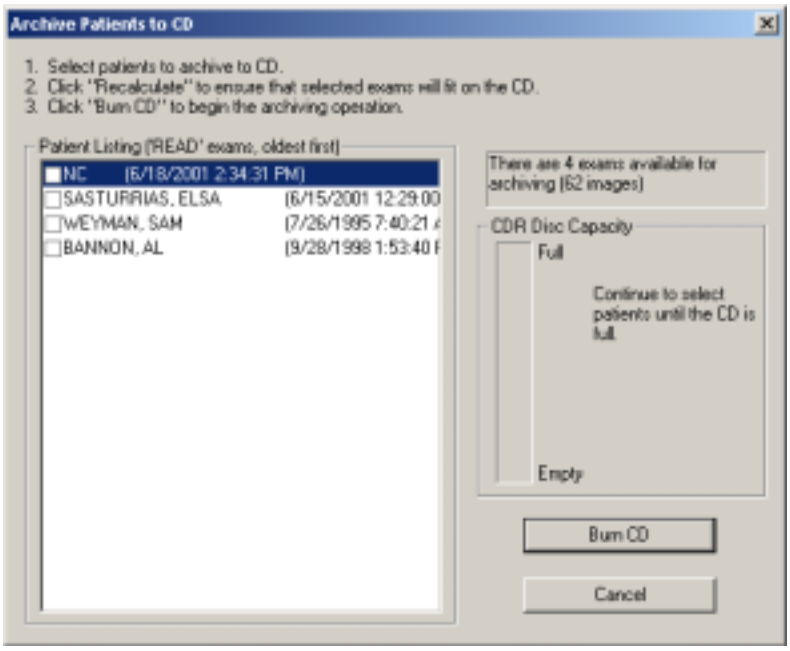
After setting your CD burning options, click OK to save the settings.

CD Archiving

☼ CD Archiving is only available on Acquire (Orex and Howtek) workstations.

CD Archiving allows you to backup exams to CD-Recordable discs and deleted them from the workstation. This is essential to saving space on an Acquire workstation when a PACS is not available to store the exams.

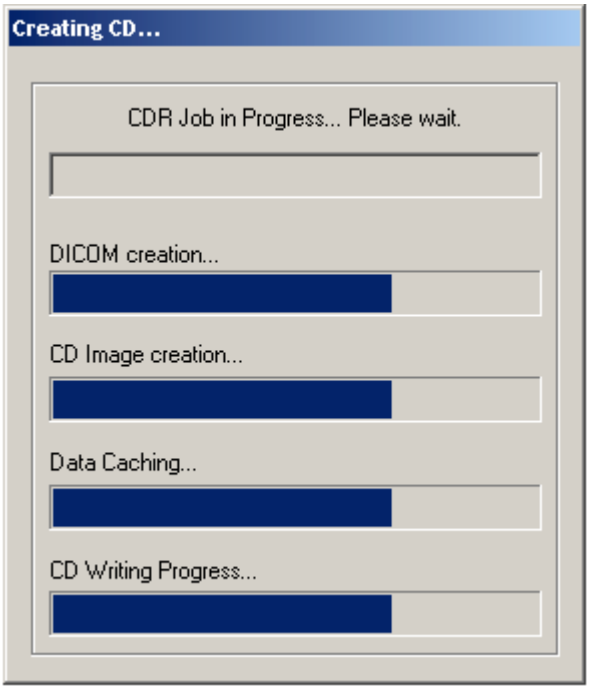
To use CD Archiving, right-click any exam in the Study List, choose “Burn to CD…”, and then “Multiple Patients (CD Archiving).”


Archive Patients to CD
1. Select patients to archive to CD.
2. Click "Recalculate" to ensure that selected exams will fit on the CD.
3. Click "Burn CD" to begin the archiving operation.
Patient Listing ('READ' exams, oldest first)
NC (6/18/2001 2:34:31 PM)
SASTURRIAS, ELSA (6/15/2001 12:29:00
WEYMAN, SAM (7/26/1995 7:40:21
BANNON, AL (9/28/1998 1:53:40
There are 4 exams available for archiving (62 images)
CDR Disc Capacity
Full
Continue to select patients until the CD is full.
Empty
Burn CD
Cancel

Patients appear in the list on the left with checkboxes. Select the patient by clicking the checkbox. The total size of the images is calculated (this may take a moment) and the “CDR Disc Capacity” gauge on the right will begin to fill. Continue to add patients until the gauge is full, then click “Burn CD.”

Exams will be burned to CD with the same progress dialog seen above with creating Patient discs, and shown again

here:



There are four progress bars and a status bar at the top.

The status bar displays the current operation, e.g. “Writing to disc…”

The DICOM Creation progress bar tracks the progress of images being saved in standard DICOM format to a temporary folder.

The CD Image Creation progress bar tracks the progress of the ISO disc image creation.

The Data Caching progress bar tracks the progress of the system caching the data to be written to disc.

Finally, the CD Writing Progress bar tracks the progress of the actual writing to disc. When this bar fills completely, the status bar at the top will display “Closing Disc” and you are

generally about three minutes away from an archive CD!

When the job completes, a message pops up on the screen. Click the “OK” button on this message and the new Patient Disc is automatically ejected from the cd burner.

Please note that CD burning is a system-intensive process and requires all of the computer’s processing to achieve. It is therefore necessary to wait while until the CD is complete before continuing to use Professional Workstation. With current recording technology and speeds, most discs are complete within ten minutes.

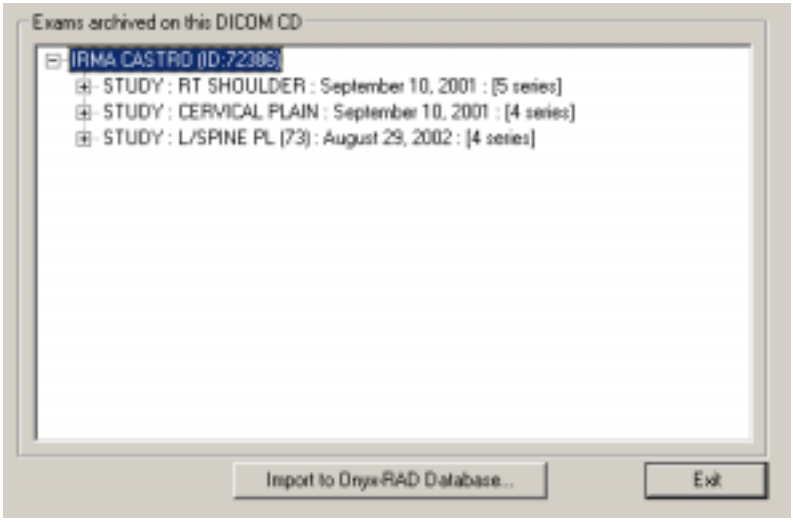
Importing Exams from Archive CDs

☼ DICOM CDs are discs that contain medical images in DICOM format and a special index named "DICOMDIR."

It is often necessary to import exams that were previously archived, or from "DICOM" cds.

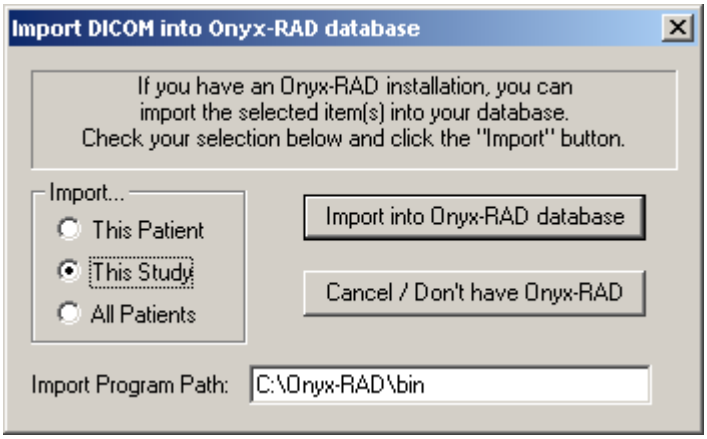
To import images from an Onyx-RAD archive disc, simply insert the disc into the cd-rom drive. After a few moments the import program should appear (pictured below.)

To import images from a DICOM cd, insert the disc into the cd-rom. Click File, Import DICOMDIR. (If the entry does not appear on the File menu, try clicking an exam in the study list first.) The import screen should appear (pictured below.)


Exams archived on this DICOM CD
IRMA CASTRO (ID:72386)
STUDY : RT SHOULDER : September 10, 2001 : [5 series]
STUDY : CERVICAL PLAIN : September 10, 2001 : [4 series]
STUDY : L/SPINE PL (73) : August 29, 2002 : [4 series]
Import to Onyx-RAD Database...
Exit

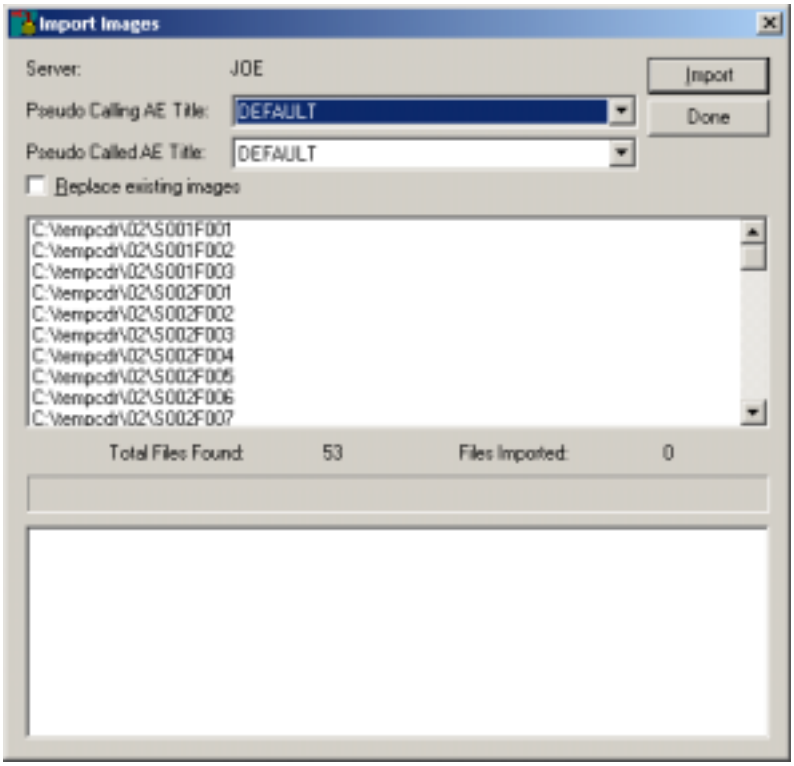
To import an exam, click the patient or study to import and click the "Import to Onyx-RAD Database" button near the bottom of the window.

The following screen will appear:


Import DICOM into Onyx-RAD database
If you have an Onyx-RAD installation, you can
import the selected item(s) into your database.
Check your selection below and click the "Import" button.
Import...
This Patient
This Study
All Patients
Import into Onyx-RAD database
Cancel / Don't have Onyx-RAD
Import Program Path:
C:\Onyx-RAD\bin

Choose whether to import the patient, the study, or all patients, and click the “Import to Onyx-RAD database” button.

The Import Images program will launch, requiring you to log in. After you log in, the following screen appears (next page):



Click the “Import” button to start importing the images.

Chapter 9

Send and Receive Exams

This chapter examines the process of sending and receiving exams “over the wire” – local area network, phone line, Internet, etc. – to and from other institutions and Onyx-RAD workstations.

The process of sending exams is explored thoroughly, including methods of tracking the progress of the studies being transmitted.

Receiving exams is also covered, specifically the requirements and configuration necessary and monitoring the progress of incoming exams.

Chapter Contents

Sending Exams : Introduction 136
Sending Exams: .ONX or DICOM 137
Send (“Push”) an Exam 138
Monitor the Progress of Pushed Exams 139
Requirements to Receive Exams 141
Sending Exams via DICOM : Configuration .. 142
Set up AE Titles 142
Set up Contact Entries 145
Automatic Sending (“Routing”) 148

Sending Exams : Introduction

Although there is some prior configuration necessary to "push" exams to other doctors, this configuration is handled by Viztek technicians. This means that you, the user, do not have to worry about setting up the transfer parameters. You simply the push the study and keep working.

You may, however, wish to set up your own routes from time to time, and this is covered near the end of the chapter.

Once the exam has been pushed, the transfer process takes place behind the scenes, and therefore does not interfere with your work as you continue to read other exams. It is possible, however, to check on the status of the exam(s) you have pushed and monitor its progress.

Sending Exams: .ONX or DICOM

Onyx-RAD supports two different methods of sending exams: standard DICOM or a proprietary method we simply call .ONX.

DICOM

Sending DICOM results in standard DICOM format and standard DICOM functions (like CSTOR, CMOVE, etc.). Any recipient who claims DICOM compliance can receive such exams. The only disadvantages to sending exams in DICOM format are:

- Lack of progress monitoring, as the DICOM standard does not provide for this
- Onyx-RAD does not send DICOM over phone line, due to the standard's lack of provision for such features as auto-resume and validity checking
- Lack of security (no encryption)

.ONX

To compensate for the shortcomings in the DICOM standard mentioned above, Viztek developed its own transfer syntax, .ONX, which provides these features:

- Progress monitoring
- Auto-resume features
- Validity checking on each image
- Secure encryption

It is recommended that you utilize the .ONX transfer syntax when sending exams to other Onyx-RAD sites.

Send (“Push”) an Exam

On the Study List screen, simply click the desired study one time. This will highlight the study to indicate that you have selected it.

Now click the “Send Study” button found near the New Patient button.

The next screen that appears contains buttons for each of the push recipients that are configured in your system. Simply click the appropriate recipient and the screen disappears, with the transfer of the exam initiated in the background.

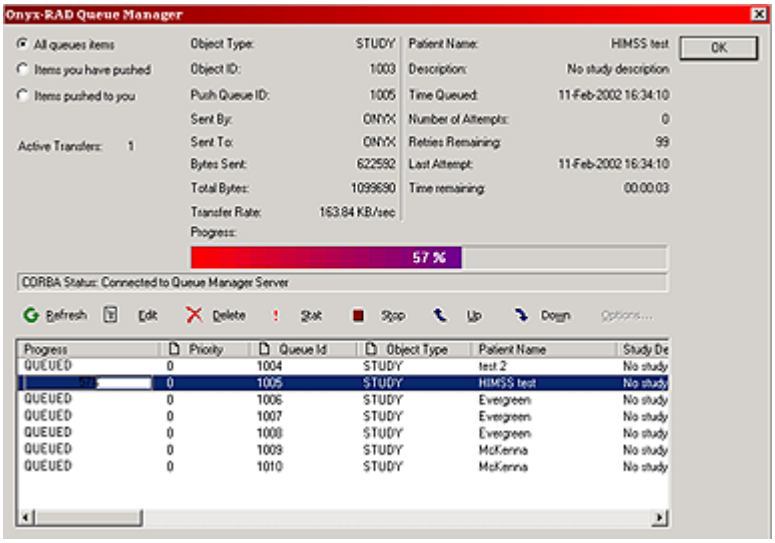
At this point you are free to continue reading exams; no further interaction is needed on your part. You may also push other exams at this time; it is not necessary to wait for one transfer to finish before initiating another.

Monitor the Progress of Pushed Exams

When you “push” an exam in Onyx-RAD Professional Workstation, the exam is added to a queue of exams waiting to be sent. The Onyx-RAD Server (or your standalone acquire workstation) software manages this queue and sends exams out in the order of their arrival in the queue. Pushed exams that are traveling to recipients over a network or the Internet are able to transfer simultaneously. Often these exams will reach their recipients not long after being pushed.

Exams that are routed over a phone line, however, will travel one at a time. Thus it may be desirable to check on the status of the exam(s) you have pushed, and even elevate the priority of certain exams so that they are sent sooner than other exams waiting in the queue. These tasks are accomplished in the Queue Management window.

To bring up the Queue Management window, simply right-click any exam in the Study List, and choose “Queue Management…” from the pop-up menu. (It does not matter which exam you right-click.) A sample of this window is seen on the next page.



the Queue Management window

The bottom half of the screen holds a list of all pending transfers in the queue, complete with progress bars. The upper half of the screen displays details on the currently selected exam.

Check the status of a pushed exam by checking its progress bar to see how far along the transfer is.

To elevate the priority of a queued exam:

Click the desired study (this will highlight it.)
Click the “Stat” button.

This exam is now “next in line” to be transferred, and will begin transmitting as soon as the transfer medium (network, phone line, etc.) is available.

It is also possible to cancel the transfer of an exam:

Click the desired study (it will highlight.)
Click the “Delete” button.

The study will be deleted from the queue and will not be transmitted. If the exam was already being transferred, the transfer will cancel and the study will be deleted from the queue.

Requirements to Receive Exams

Receiving exams from other Onyx-RAD sites requires:

- Onyx-RAD Listener Agent software
- A connection medium between you and the sender (phone line, network, Internet, etc.)

All configuration is handled by Viztek technicians.

For the connection medium:

- If a phone line is used, 56k modems are recommended.
- If a local area network (LAN) is available, a 100Mbps connection is recommended, and a static IP address is required.
- If the Internet is to be used, a static IP address is required, as well as a constant connection. A digital subscriber line (DSL) is recommended.

Receiving DICOM exams from any sender requires:

- Onyx-RAD DICOM Gateway (also commonly referred to as “CStore Server”)
- A connection medium between you and the sender (network, Internet, etc.)

Viztek technicians will handle the configuration on your (the receiving) side, and provide the sender with the necessary information – your host address, AE Title, port number, etc. – to send you DICOM exams.

Please contact Viztek, Inc. to add receiving capability to your Onyx-RAD workstation.

Sending Exams via DICOM : Configuration

The next few topics explore how to set up a "push" entry for each DICOM recipient you wish to send exams to. Sending exams via DICOM requires more setup than the .ONX format, including the configuration of AE Titles and manual/automatic sending.

Set up AE Titles

The DICOM standard dictates that senders and receivers must define for themselves (and answer to) an AE (Application Entity) Title. To send DICOM exams to your intended recipient you will need some basic information:

- Recipient's AE Title
- Recipient's network (IP) address or hostname
- Recipient's port number

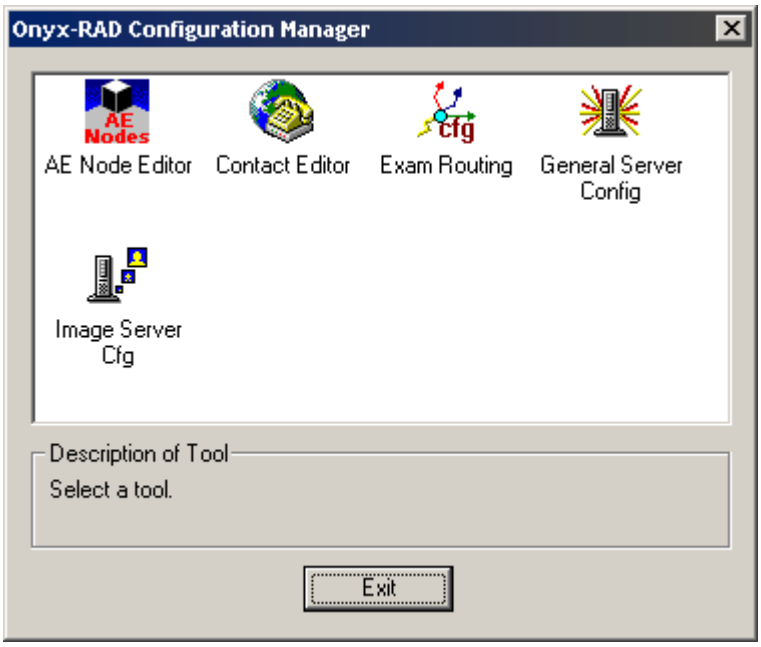
(As for your own workstation's AE Title, you should check with the receiver and agree on an AE Title to use. Usually the receiving software will only allow connections from AE Titles that have been configured at the other site.)

First, start Onyx-RAD Configuration Manager. Click Start, then Programs, then Onyx-RAD, then Configuration Manager. (If this is not in the menu, open a command prompt [Start, Run, "cmd", click OK], then enter the following:

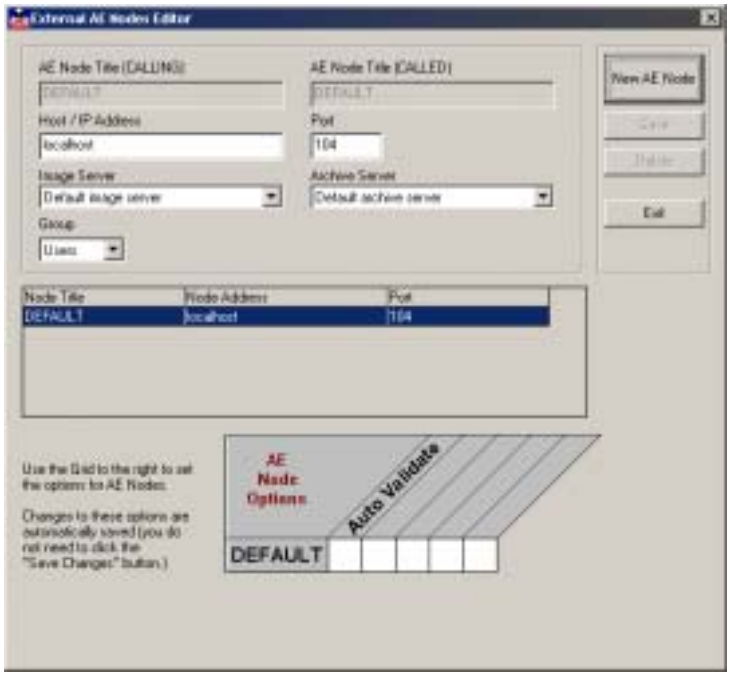
```
cd \onyx-rad\bin
cfgmgr
```

Configuration Manager will require you to log on to your database; the username and password are the same values you use to log on to the Viewer.

The Configuration Manager should resemble the picture below:



Double Click the AE Node Editor icon to start the AE Node Editor. A sample screenshot appears below:



Click “New AE Node” and set up the AE Node as follows:

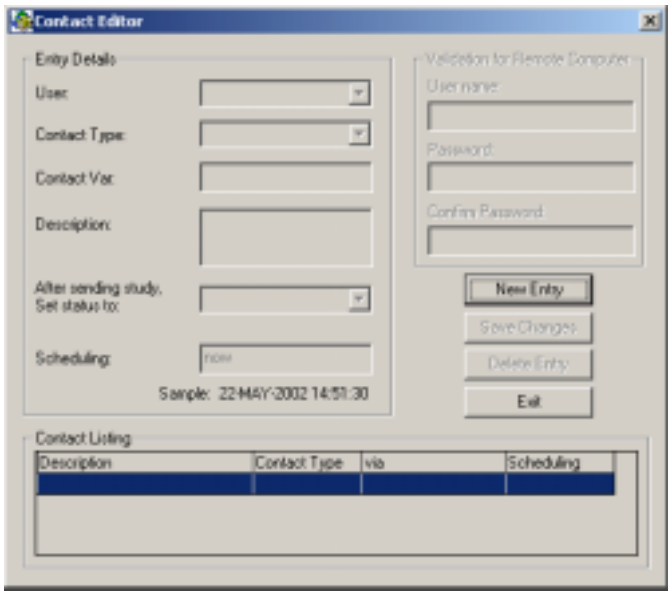
- Destination / Calling AE Title : enter the AE Title of your intended recipient
- Source / Called AE Title : enter your AE Title here (you may use “ONYXRAD”, for example.)
- Host IP/Address : enter the network address of your recipient.
- Port : enter the port number on which the recipient will listen for DICOM transmissions
- Image Server : select “Default Image Server”
- Archive Server : select “Default Archive Server”
- Group : select “Users”
- The options grid at the bottom (contains the “Auto Validate” option, for example) is not relevant to this outgoing entry.

Click “Save.” If all required fields have values, your new AE Node will appear in the listing. Click “Exit.”

Set up Contact Entries

You must set up a Contact Entry (“Push Entry”) for each person/site you wish to send exams to. Push Entries appear as individual buttons when you perform a right-click, Send To… on the Study List, and also appear in a list when you are setting up automatic routes. Note that in order to set up a DICOM push entry, you must set up the AE Titles first (previous topic).

In Configuration Manager, double-click the Contact Editor icon. The Onyx-RAD Contact Editor screen should be similar to this:



To set up an .ONX format entry (for sending to other Onyx-RAD sites):

1. Click “New Entry”

2. For User, choose your desired user (default is the user “ONYX”)

3. Contact Type : Choose *Network* or *Dialup*, as appropriate.

4. (Network) Host Name/IP : Enter network address of recipient.
   (Dialup) Phone Number : Enter the full phone number (including 1 + area code if necessary) of the recipient.

5. Description: The text you enter here will appear on the button that you see in the “Send To…” dialog. It is also the text you will see in the Routing Configuration dialog (explored later in this chapter.)

6. (Dialup) Enter the dialup user name and password on the right side of this dialog.

7. After sending study, set status to: The most common values for this are “NONE” (don’t change the exam’s status) or “DELETED” (set the exam to be deleted after it sends successfully.)

8. Scheduling: “now” is the most common value, or you can set a specific date and time.

9. Click “Save”.

Your new contact will appear in the list. Click Exit.

To set up a DICOM format entry (for sending to any DICOM-compliant software):

1. Click “New Entry”

2. For User, choose your desired user (default is the user “ONYX”)

3. Contact Type : Choose *CSTORE.*

4. Dest AE Node: Choose the AE Title from the drop-down list. This list comes from the AE Titles created in the AE Node Editor tool.

5. Description: The text you enter here will appear on the button that you see in the “Send To…” dialog. It is also the text you will see in the Routing Configuration dialog (explored later in this chapter.)

6. After sending study, set status to: The most common values for this are “NONE” (don’t change the exam’s status) or “DELETED” (set the exam to be deleted after it sends successfully.)

7. Scheduling: “now” is the most common value, or you can set a specific date and time.

8. Click “Save”.

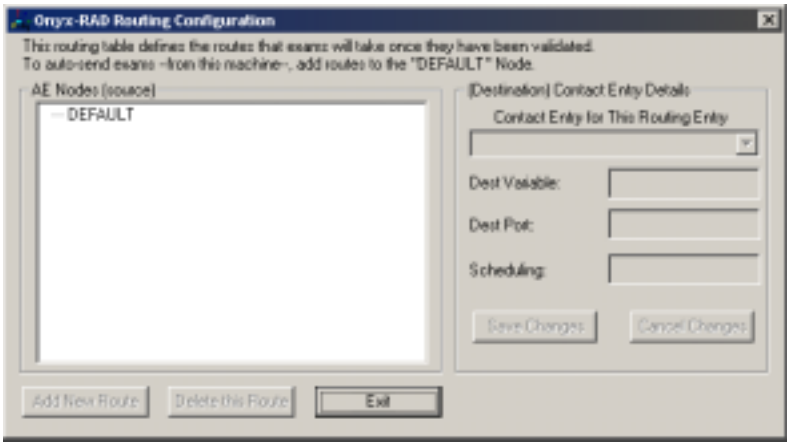
Your new contact will appear in the list. Click Exit.

Automatic Sending ("Routing")

Normally you must actively push an exam in order to send it (right-click and choose "Send To…" from the Study List.) However, Onyx-RAD can be configured to automatically send exams once they are validated. This is especially useful for Acquire workstations.

You must first enter AE Titles (if sending DICOM) in the AE Node Editor and a Contact Entry in the Contact Editor (see the previous topic.) After these steps have been taken care of, you can create a route.

In Configuration Manager, double-click the "Exam Routing" icon. The Routing Configuration window will appear after a few moments:


Onyx-RAD Routing Configuration
This routing table defines the routes that exams will take once they have been validated.
To auto-send exams -from this machine-, add routes to the "DEFAULT" Node.
AE Nodes (source)
DEFAULT
(Destination) Contact Entry Details
Contact Entry for This Routing Entry
Dest Variable:
Dest Port:
Scheduling:
Save Changes
Cancel Changes
Add New Route
Delete this Route
Exit

Click the node to add a default route *from*, in most cases you will click the entry titled "DEFAULT." Click the "Add New Route" button.

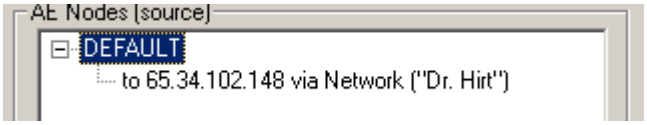
On the right side of the window, select a Push Entry from the drop down box. This box lists all the entries you have previously set up using the "Contact Editor" utility in Configuration Manager. (If you have not set up any entries,

exit from this window and set up an entry first.)

The next two boxes will fill with the values stored in the contact entry (e.g., network address and port), and the scheduling box will be empty. For a temporary route, enter a specific date and time. Otherwise, enter “now” (without quotes) in the box.

Finally, click “Save Changes”.

You can verify configured routes by expanding the list on the left side of the window (click the little plus box next to an AE Title to view routes.)



Click “Exit” to exit the Routing Configuration tool.

When routes are set up, exams are automatically added to the push queue (according to the routes) once they are validated.

Chapter
10

Every Toolbar

Onyx-RAD contains many toolbars and menus, designed to allow quick access to the features of the software. Because each individual will only use a subset of all the tools available, the vast number of options may seem daunting.

This chapter explores every toolbar found in Professional Workstation, and describes the usage of each function found therein.

Chapter Contents

The Toolbars : Overview.....152
Standard toolbar 153
View Operations toolbar 154
Image Left-button Operations toolbar 155
Image Layout toolbar 156
Annotations toolbar.....158
Group Control toolbar 159

The Toolbars : Overview

Many software applications make use of toolbars to provide the user with shortcut buttons to common functions. These buttons are quicker than expanding a menu from the menu bar and selecting the entry. (One click compared to multiple.) Toolbars are simply a grouping of such one-click buttons.

Onyx-RAD Professional Workstation makes great use of toolbars. Almost every function available through the menus has an associated button on the toolbar.

It is important to remember that while toolbars increase a user's efficiency by providing easy one-click access to common features, there are so many buttons on the Onyx-RAD toolbar that initially it may seem less efficient. Like anything else, practice and experience will lead to efficient usage of these shortcuts. With time the toolbars will become second nature, and your speed will increase dramatically.

Professional Workstation contains the following toolbars:

- Standard (log on/off, show/hide windows)
- View Operations (rotate, flip, invert, etc.)
- Cut-Line Operations (cut-lines)
- Cine
- Image Left-button Operations (window & level, magnify, zoom, etc.)
- Image Layout (number of columns, link frames, etc.)
- Annotations (arrow, circle, measure, etc.)
- Group Control (prev/next series, sort, etc.)

Each toolbar is pictured and explored over the next several pages.

Standard toolbar

These buttons are shortcuts to the entries found in the File and View menus.

Open a DICOM or .ONX image file

Log on to the database

Log off of the database

Import a DICOMDIR formatted exam

"Export CD" – copy a study to a CD-Recordable disc

Show/Hide the Series window

Show/Hide the Worklist window

Show/Hide the Config bar window

Show/Hide the 3-D Slices window

Mark Study Change the status of the study (unread, read, etc.) – only available on the Study List screen.

View Operations toolbar

This toolbar contains buttons that are shortcut to entries found on the Image menu.

☼ Remember that these image manipulations (except for Key Image) will affect *all* images in the current series if the "Share Single Frame Properties with Group" option is enabled. See page 157.

Flip image horizontally

Flip image vertically

Rotate image 90 degrees counter-clockwise

Rotate image 90 degrees clockwise

True Size (expand/shrink image to true size)

Fit to Window (expand/shrink image to fit in window)

Invert black and white pixels

Invert red and blue colors (ultrasound)

Reset all aspects of the selected image to its original state

Show/Hide image overlays

Invert image overlay text color

Mark image as a key image

Image Left-button Operations toolbar

This toolbar contains buttons that are shortcuts to the entries found on the image context menu. Click any one of these buttons to activate the tool; click again to revert to no tool.

changes mouse cursor to default pointer

It is a good idea to use this after using one of the other tools to "turn off" the selected tool.

changes mouse cursor to Width & Center tool

See "Width & Center", page 63

changes mouse cursor to Gamma Correction tool

allows "spanning" in the Series/Stack window

☼ Remember that these image manipulations will affect *all* images in the current series if the "Share Single Frame Properties with Group" option is enabled. See page 157.

changes mouse cursor to the Magnify tool

See "Magnify", page 67

changes mouse cursor to the Pan tool

See "Pan", page 66

changes mouse cursor to the Zoom tool

See "Zoom", page 65

enters Annotation mode

When in Annotation mode, right-clicking an image in the Image Window results in a special Annotation popup menu from which you can select and delete annotations. Click this button again to exit Annotation mode.

Image Layout toolbar

This toolbar contains buttons that are shortcuts to the entries found on the Layout menu.

☼ You can change column layouts as often as necessary.

toggles whether the column buttons affect the Series/Stacks window or the Image Viewing window

displays images in one column

displays images in two columns

displays images in three columns

displays images in four columns

displays images in sixteen columns

define the number of columns to display images

Fixed choose a fixed row and column display size for images

activates vertical compare mode (see page 95)

activates horizontal compare mode (see page 95)

activates compare scroll (see page 95)

activates group scroll

manual synchronize series

auto synchronize series
When enabled, certain series (like a T1 and T2 of the same sequence) will scroll together automatically.

share single-frame properties with group

A very important button, when enabled this causes any image manipulation performed on one image (like zoom, pan, width & center, etc.) to be performed on all images in the same series.

load across multiple monitors

Only available with multiple monitors, this causes all series to load on the left-most monitor, while images will be displayed across all the monitors. This gives the effect of looking at one big piece of film.

load multiple studies on separate monitors

Only available with multiple monitors, this loads separate studies onto separate monitors when viewing more than one study at once. When this button is turned off, each study loads a copy on each monitor.

Annotations toolbar

This toolbar contains buttons that are shortcuts to entries found in the Annotate menu.

enters annotation mode
When in Annotation mode, right-clicking an image in the Image Window results in a special Annotation popup menu from which you can select and delete annotations. Click this button again to exit Annotation mode.

changes mouse cursor to straight line tool (see page 75)

changes mouse cursor to ellipse tool (see page 76)

changes mouse cursor to box tool (see page 77)

changes mouse cursor to arrow tool (see page 78)

changes mouse cursor to freehand drawing tool (see page 79)

changes mouse cursor to textbox tool (see page 80)

changes mouse cursor to ruler tool (see page 81)

changes mouse cursor to measure angle tool (see page 82)

Loads annotations from the database

Saves (new and changes to existing) annotations to the database.

Group Control toolbar

This toolbar contains button that are shortcuts to entries found in the Group menu.

move to the next series

move to the previous series

moves selected series right one monitor

moves selected series left one monitor

sorts images in by slice location

sorts images by image number (usually desired)

Installing Onyx-RAD

Onyx-RAD installation is designed to be easy. Use this chapter to quickly walk through a typical installation.

Chapter Contents

Installing.....162

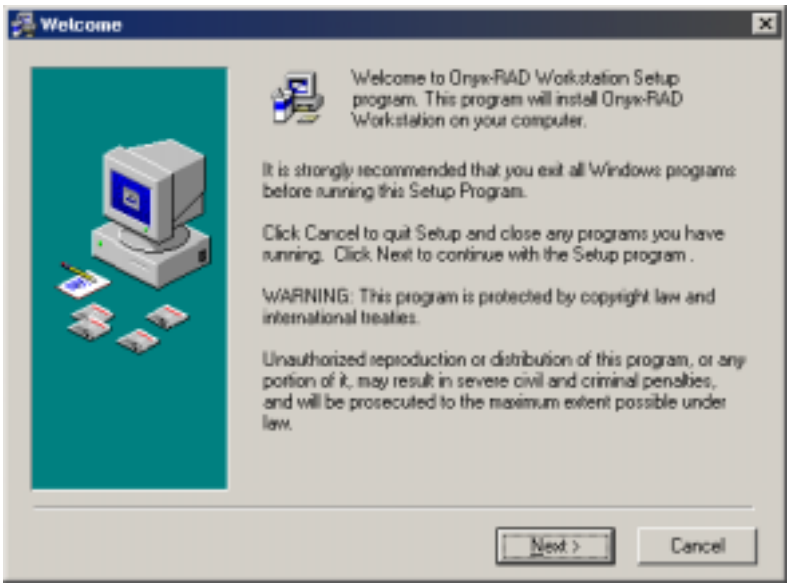
Installing

You should begin by installing your protection dongle. If it is a USB key, a “Found New Hardware” dialog will most likely appear after a few moments. Simply click the “Cancel” button if this occurs.

Your Onyx-RAD CD should contain a file named “OnyxRADWorkstationSetup”. Run this program to begin installing Onyx-RAD. (On many Windows computers, this program will start automatically a few moments after inserting the disc.)

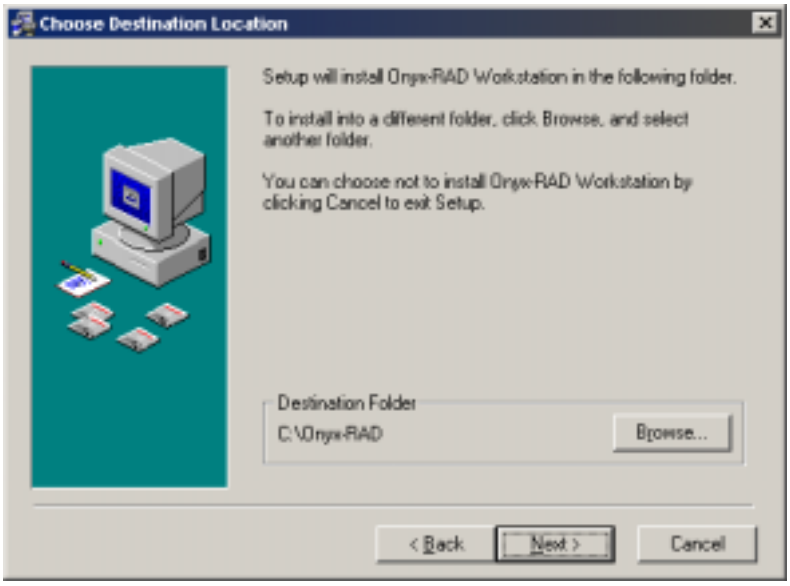
The installation process will present you with several dialogs, for most of which you will simply click “Next”.

The first dialog is a copyright notice and standard Windows warnings about closing other programs before continuing the installation process.


Welcome
Welcome to Onyx-RAD Workstation Setup program. This program will install Onyx-RAD Workstation on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup Program.
Click Cancel to quit Setup and close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

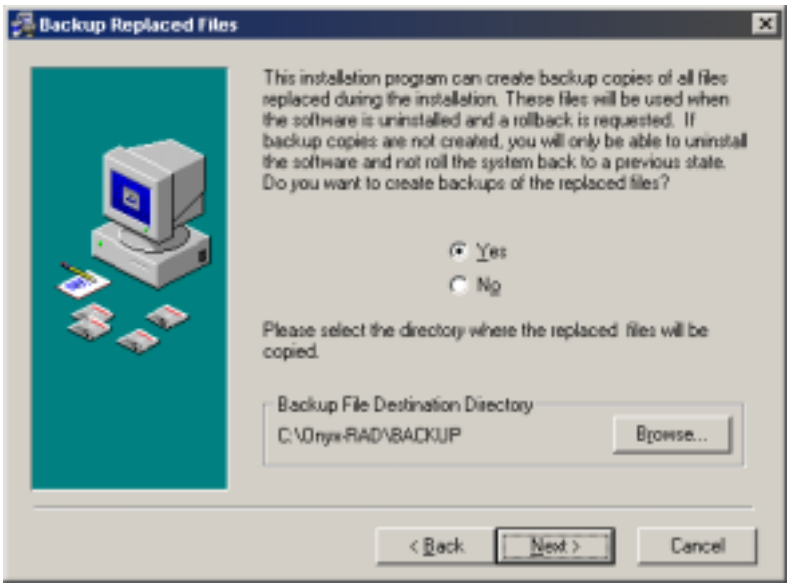
Click Next.

The next dialog is titled “Choose Destination Location”. The default location of “C:\Onyx-RAD” is already selected, but you can change this by following the directions on the dialog.


Choose Destination Location
Setup will install Onyx-RAD Workstation in the following folder.
To install into a different folder, click Browse, and select another folder.
You can choose not to install Onyx-RAD Workstation by clicking Cancel to exit Setup.
Destination Folder
C:\Onyx-RAD
Browse...
< Back
Next >
Cancel

Click “Next” to continue.

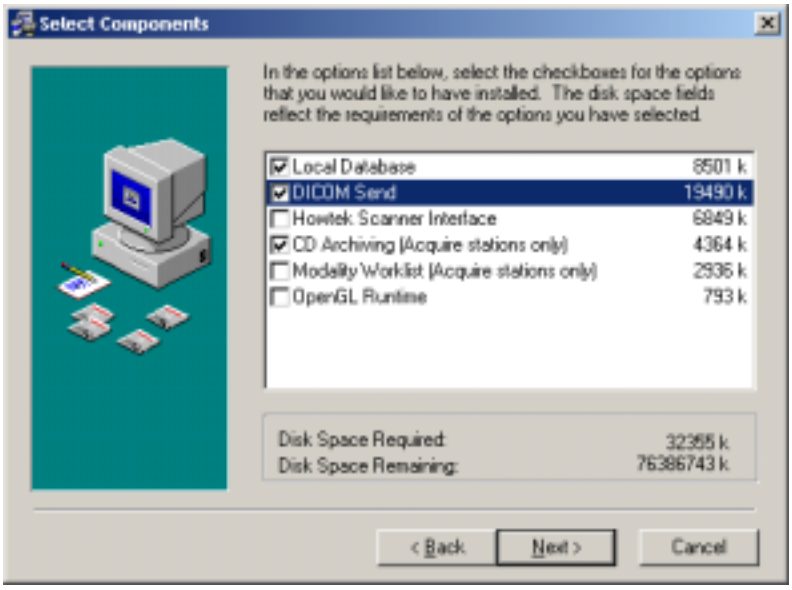
The next dialog is titled “Backup Replaced Files”. Here you can choose whether to make backup copies of all files replaced during the installation. This is generally a good idea, so the “Yes” option is already selected. You can also change the location of the backup folder.


Backup Replaced Files
This installation program can create backup copies of all files replaced during the installation. These files will be used when the software is uninstalled and a rollback is requested. If backup copies are not created, you will only be able to uninstall the software and not roll the system back to a previous state. Do you want to create backups of the replaced files?
Yes
No
Please select the directory where the replaced files will be copied.
Backup File Destination Directory
C:\Onyx-RAD\BACKUP
Browse...
< Back
Next >
Cancel

Click “Next” to continue.

The next dialog is titled “Select Components”. This is an important dialog because it allows you to choose what Onyx-RAD components will be installed. Depending on the version you have purchased, the component list may be slightly different than what you see here. Common components are described below.

☼ For an Orex workstation, select the following options:
-- Local Database
-- DICOM Send
--CD Archiving


Select Components
In the options list below, select the checkboxes for the options that you would like to have installed. The disk space fields reflect the requirements of the options you have selected.
Local Database 8501 k
DICOM Send 19490 k
Howtek Scanner Interface 6849 k
CD Archiving (Acquire stations only) 4364 k
Modality Worklist (Acquire stations only) 2936 k
OpenGL Runtime 793 k
Disk Space Required: 32355 k
Disk Space Remaining: 76386743 k
< Back
Next >
Cancel

Local Database: This should be enabled unless an Onyx-RAD Server is present. With a local database, all images are stored on the workstation.

Sample Studies: This will install a large selection of sample exams, including MRI, CT, US, and CR images.

DICOM Send: Includes components necessary for sending DICOM exams to a 3rd party.

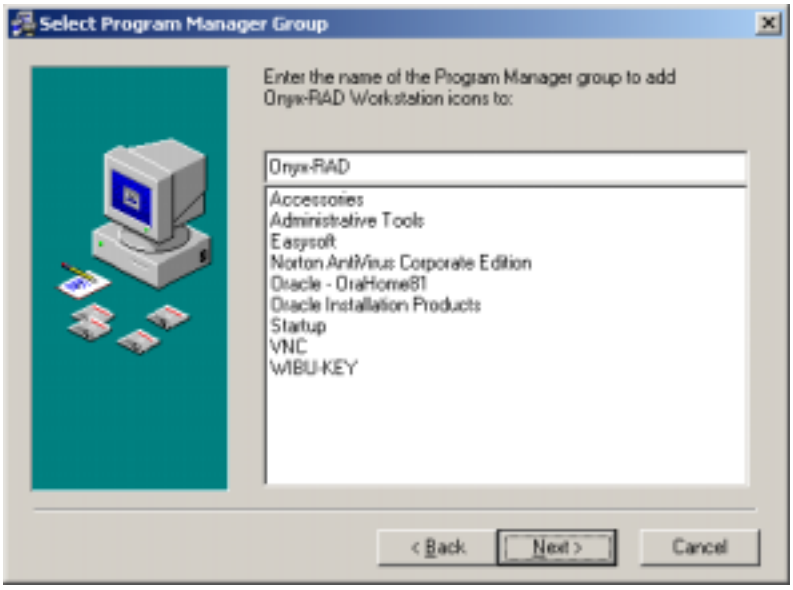
Howtek Scanner Interface: indicates that this will be a Howtek Acquire workstation, and includes the necessary components.

CD Archiving: includes components necessary to create CD archives. These components will only work for Acquire workstations (Howtek and Orex.)

OpenGL Runtime: Some video card drivers do not include OpenGL support, which is needed for the 3D Slices feature. This component will include the OpenGL drivers. Generally it is not needed.

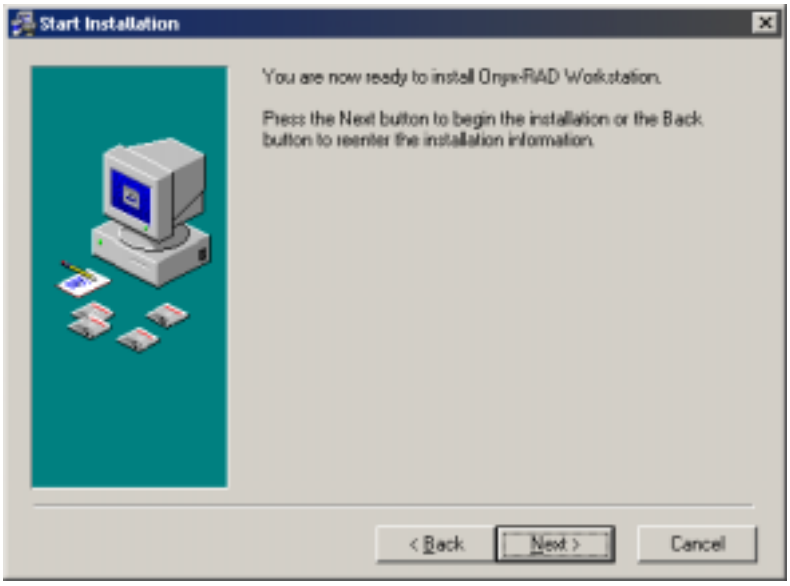
Click “Next” to continue.

The next dialog is titled “Select Program Manager Group.” This dialog allows you to define a different Group for the Onyx-RAD software to be installed into. The default (Onyx-RAD, which will create a new Group) is the best choice.



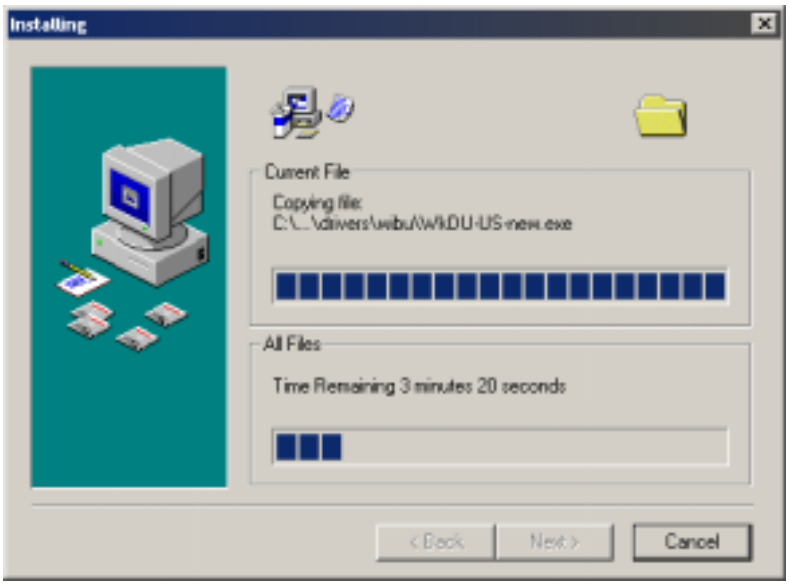
Click “Next” to continue.

The next dialog indicates that you are ready to begin installing Onyx-RAD Workstation. When you click “Next” on this dialog, the process of copying and installing files to your computer will begin.


Start Installation
You are now ready to install Onyx-RAD Workstation.
Press the Next button to begin the installation or the Back button to reenter the installation information.
< Back
Next >
Cancel

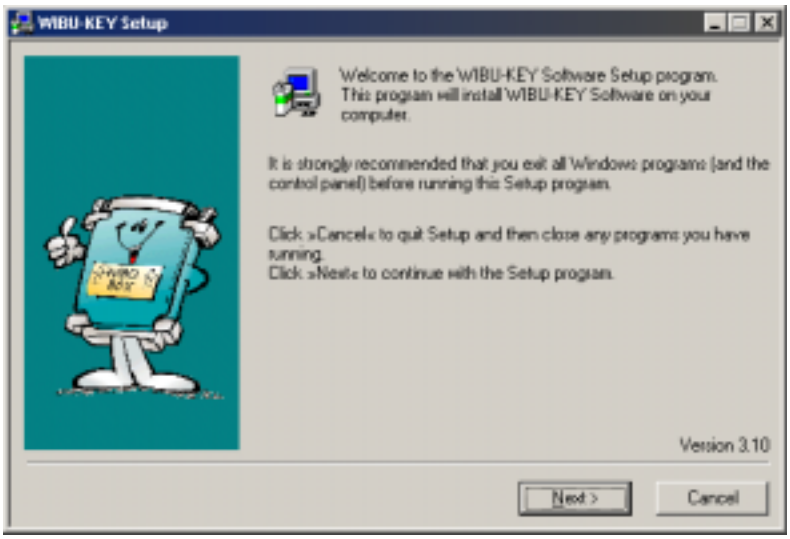
Click “Next” to begin the file copy and installation process.

The “Installing” dialog keeps you informed of the installation progress.



About one-third through the file copying, the WIBU-KEY Setup dialog will appear:

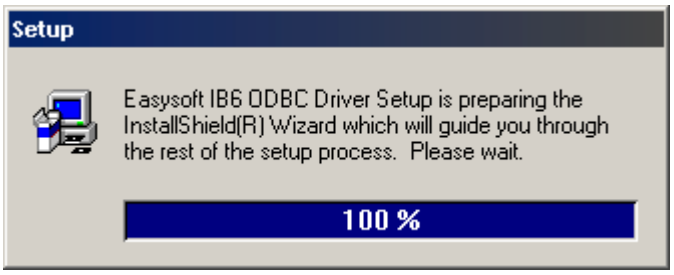
☼ You must install the WIBU-KEY drivers in order to run Onyx-RAD software.


WIBU-KEY Setup
Welcome to the WIBU-KEY Software Setup program.
This program will install WIBU-KEY Software on your computer.
It is strongly recommended that you exit all Windows programs (and the control panel) before running this Setup program.
Click »Cancel« to quit Setup and then close any programs you have running.
Click »Next« to continue with the Setup program.
Version 3.10
Next >
Cancel

Click “Next” to continue, and “Next” on the next dialog as well. Files will copy and the “Next” button will light up again. When it does, click “Next”. A final WIBU-KEY dialog informs you that setup is complete. Uncheck the checkbox next to “Yes, I want to view the readme file now”, and click “Finish.” A message will pop up indicating the WIBU-KEY driver has been installed; click “OK”.

Onyx-RAD installation will continue.

Near the end of file copying, the Interbase 6 ODBC setup will begin:


Setup
Easysoft IB6 ODBC Driver Setup is preparing the InstallShield(R) Wizard which will guide you through the rest of the setup process. Please wait.
100 %

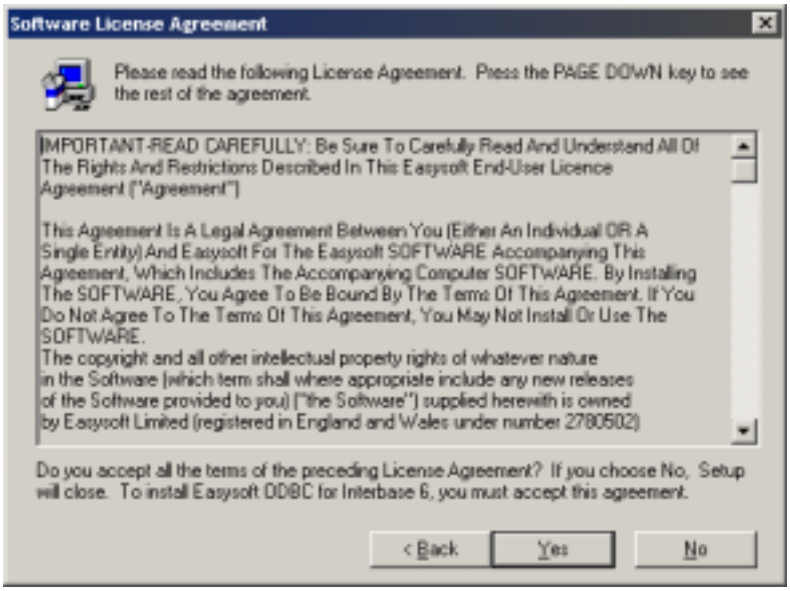
After several moments a new setup window will appear to guide you through the Interbase 6 ODBC driver setup. (You may need to check for it on the task bar at the bottom of the screen, and click on it to make it appear.)

☼ You must install the Interbase ODBC driver if you selected the "Local Database" component.

Welcome
easysoft
Interbase
6
ODBC
Welcome to the Easysoft ODBC for Interbase 6 Setup program. This program will install Easysoft ODBC for Interbase 6 on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
Next >
Cancel

Click "Next" to continue.

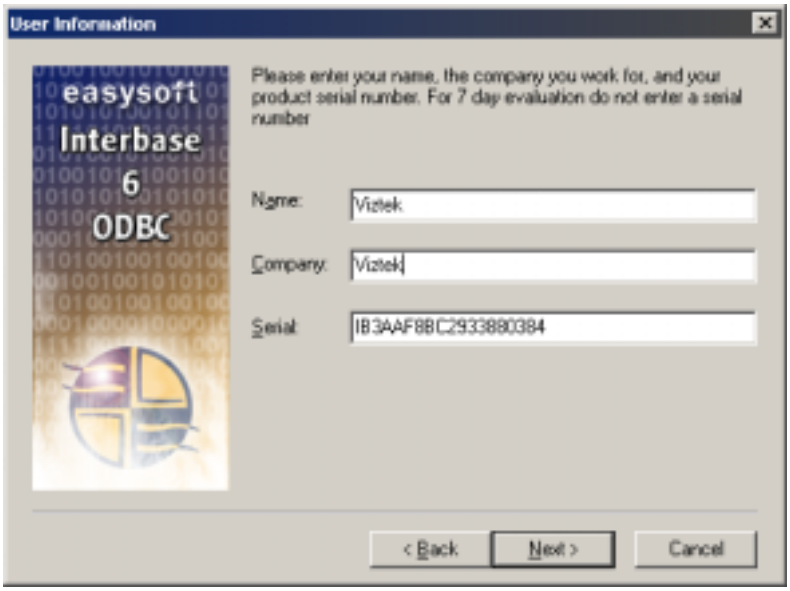
The next dialog is a license agreement dialog:


Software License Agreement
Please read the following License Agreement. Press the PAGE DOWN key to see the rest of the agreement.
IMPORTANT-READ CAREFULLY: Be Sure To Carefully Read And Understand All Of The Rights And Restrictions Described In This Easysoft End-User Licence Agreement ("Agreement")
This Agreement Is A Legal Agreement Between You (Either An Individual OR A Single Entity) And Easysoft For The Easysoft SOFTWARE Accompanying This Agreement, Which Includes The Accompanying Computer SOFTWARE. By Installing The SOFTWARE, You Agree To Be Bound By The Terms Of This Agreement. If You Do Not Agree To The Terms Of This Agreement, You May Not Install Or Use The SOFTWARE.
The copyright and all other intellectual property rights of whatever nature in the Software (which term shall where appropriate include any new releases of the Software provided to you) ("the Software") supplied herewith is owned by Easysoft Limited (registered in England and Wales under number 2780502)
Do you accept all the terms of the preceding License Agreement? If you choose No, Setup will close. To install Easysoft ODBC for Interbase 6, you must accept this agreement.
< Back
Yes
No

Click “Yes” to continue.

Next is a release notes dialog, click “Next” to continue.

A “User Details” dialog appears:



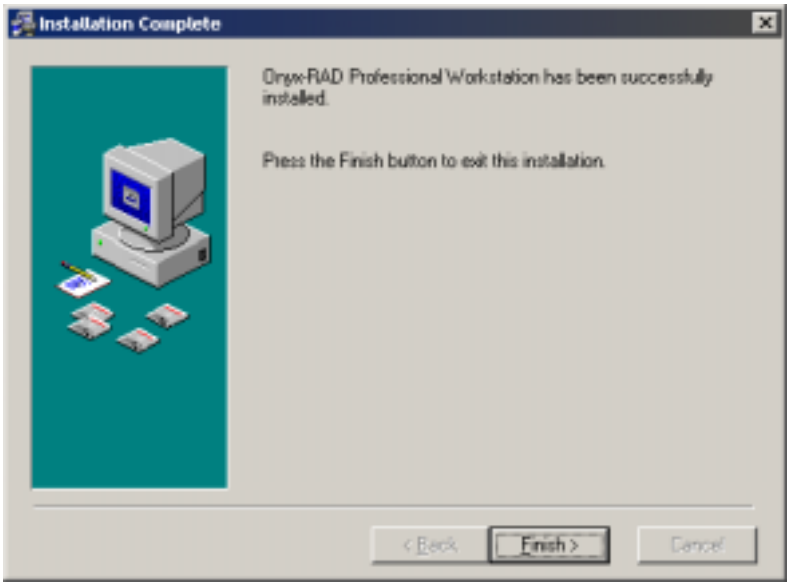
You should enter “Viztek” (without quotes) for both the “Name” and “Company” fields. The serial number is already entered.

Click “Next” to continue.

The next dialog is a “Choose Destination Location” dialog. You should keep the default location and simply click “Next” to continue.

A final dialog will indicate that Interbase 6 ODBC installation is complete. Click “Finish” on this dialog to return to Onyx-RAD installation.

At this point, the installation will perform some setup tasks in the background, so please be patient. Eventually an "Installation Complete" dialog will appear:


Installation Complete
Onyx-RAD Professional Workstation has been successfully installed.
Press the Finish button to exit this installation.
< Back
Finish >
Cancel

Click "Finish" to complete the installation.

When asked to reboot, please do so.

Appendix
B

Configuration Manager

Onyx-RAD Configuration Manager contains many tools to help you quickly configure your Onyx-RAD software. This chapter explores these tools.

Chapter Contents

Start Configuration Manager....178
AE Node Editor....179
Contact Editor....182
Exam Routing....186
General Server Config....189
Image Server Config....191

Start Configuration Manager

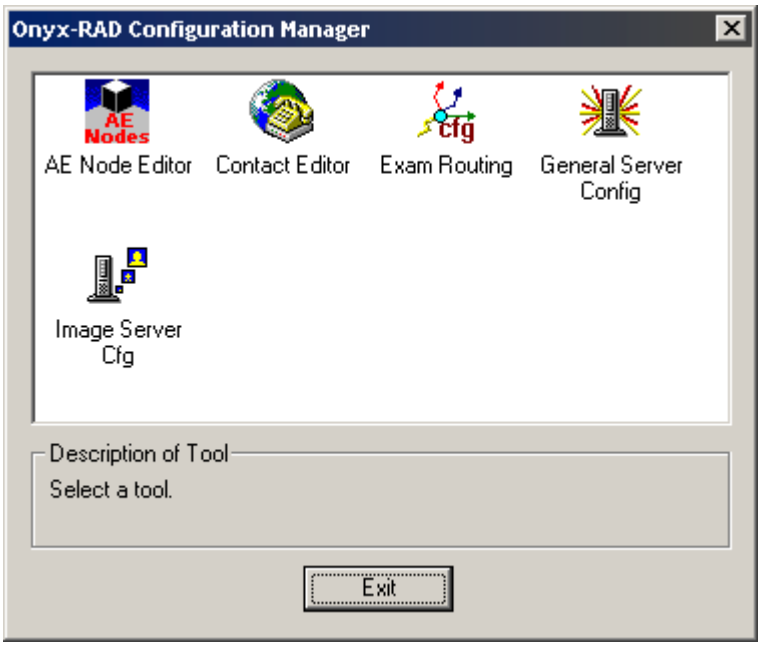
Click the "Start" button found at the very bottom-left corner of the screen:

Choose Programs, choose Onyx-RAD, choose Configuration Manager.

You must log on using the same username and password that you use to log on with Professional Workstation. (Often, the user name and password are both "onyx".)

☼ Your Configuration Manager may not contain all of the tools shown here.

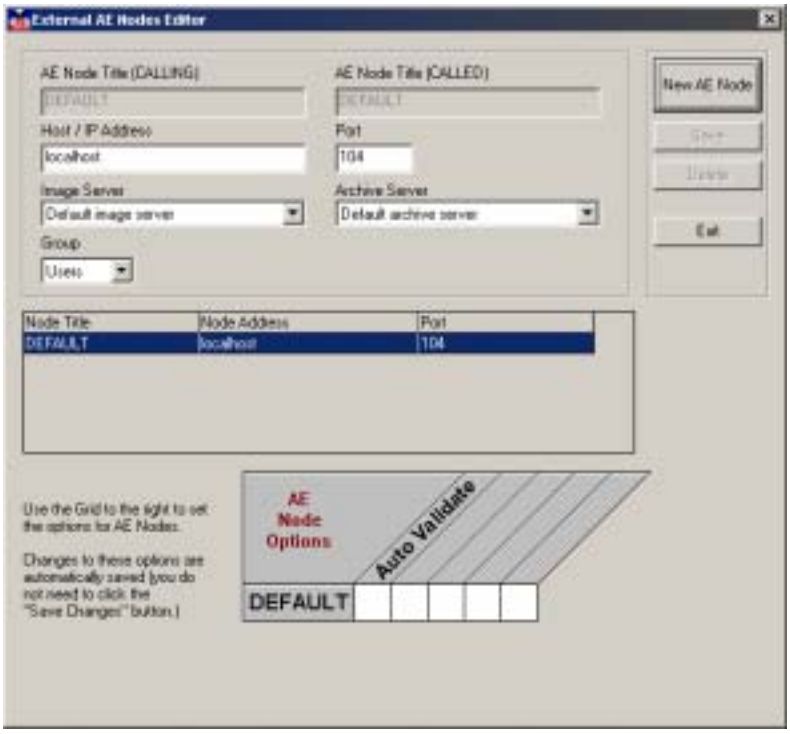
The Configuration Manager window appears:



Each of the remaining topics in this chapter explores the tools found in Configuration Manager.

AE Node Editor

This tool is for adding and managing AE Titles. AE Nodes created here are used in the Contact Editor and the Exam Routing tools.



***To add a new AE Title*:**

Click “New AE Node” and set up the new AE Node as follows:

- Destination / Calling AE Title : enter the AE Title of your intended recipient
- Source / Called AE Title : enter your AE Title here (you may use “ONYXRAD”, for example.)
- Host IP/Address : enter the network address of your recipient.
- Port : enter the port number on which the recipient will listen for DICOM transmissions
- Image Server : select “Default Image Server”
- Archive Server : select “Default Archive Server”
- Group : select “Users”

The Options grid at the bottom of the dialog currently contains only “Auto Validate”, which is only relevant for incoming exams. If you turn this option on for the “DEFAULT” node, DICOM exams that are received will be automatically validated (i.e., marked “UNREAD”) after ten minutes.

Click “Save.” If all required fields have values, your new AE Node will appear in the listing. Click “Exit.”

***To edit an existing AE Node*:**

Click the node in the listing and the boxes above will display the node’s information. Click in any of the boxes and change the information as necessary. When finished, click “Save Changes”.

Note that you cannot change certain fields for the “DEFAULT” node.

***To delete an AE Node*:**

Click the node in the list and the boxes above will display the node's information. Click the "Delete" button to remove the Node.

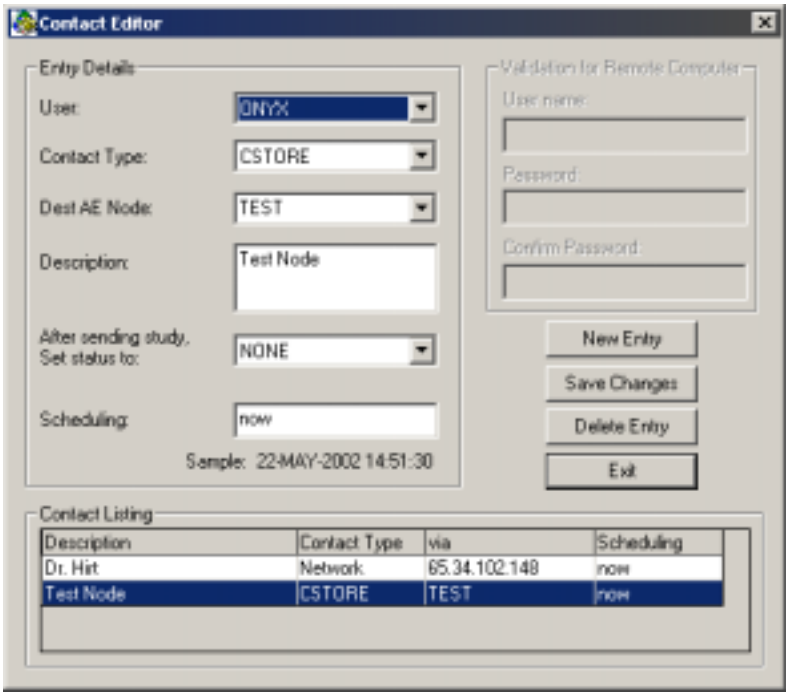
Note that you cannot remove the "DEFAULT" node, as it is necessary for Onyx-RAD to function.

***To exit AE Node Editor*:**

Click the "Exit" button to return to the main Configuration Manager window.

Contact Editor

Contact Editor is the tool used to create and manage Contact Entries, also known as Push Entries. These entries appear on the "Send To" dialog when you are pushing studies.



To set up an .ONX format entry (for sending to other Onyx-RAD sites):

10. Click “New Entry”

11. For User, choose your desired user (default is the user “ONYX”)

12. Contact Type : Choose *Network* or *Dialup*, as appropriate.

13. (Network) Host Name/IP : Enter network address of recipient.
    (Dialup) Phone Number : Enter the full phone number (including 1 + area code if necessary) of the recipient.

14. Description: The text you enter here will appear on the button that you see in the “Send To…” dialog. It is also the text you will see in the Routing Configuration dialog (explored later in this chapter.)

15. (Dialup) Enter the dialup user name and password on the right side of this dialog.

16. After sending study, set status to: The most common values for this are “NONE” (don’t change the exam’s status) or “DELETED” (set the exam to be deleted after it sends successfully.)

17. Scheduling: “now” is the most common value, or you can set a specific date and time.

18. Click “Save”.

Your new contact will appear in the list. Click Exit.

To set up a DICOM format entry (for sending to any DICOM-compliant software):

9. Click “New Entry”

10. For User, choose your desired user (default is the user “ONYX”)

11. Contact Type : Choose *CSTORE.*

12. Dest AE Node: Choose the AE Title from the drop-down list. This list comes from the AE Titles created in the AE Node Editor tool.

13. Description: The text you enter here will appear on the button that you see in the “Send To…” dialog. It is also the text you will see in the Routing Configuration dialog (explored later in this chapter.)

14. After sending study, set status to: The most common values for this are “NONE” (don’t change the exam’s status) or “DELETED” (set the exam to be deleted after it sends successfully.)

15. Scheduling: “now” is the most common value, or you can set a specific date and time.

16. Click “Save”.

Your new contact will appear in the list. Click Exit.

***To edit an existing Contact Entry*:**

Click the entry in the listing and the boxes above will display the entry's information. Click in any of the boxes and change the information as necessary. When finished, click "Save Changes".

***To delete a Contact Entry*:**

Click the entry in the list and the boxes above will display the entry's information. Click the "Delete" button to remove the entry.

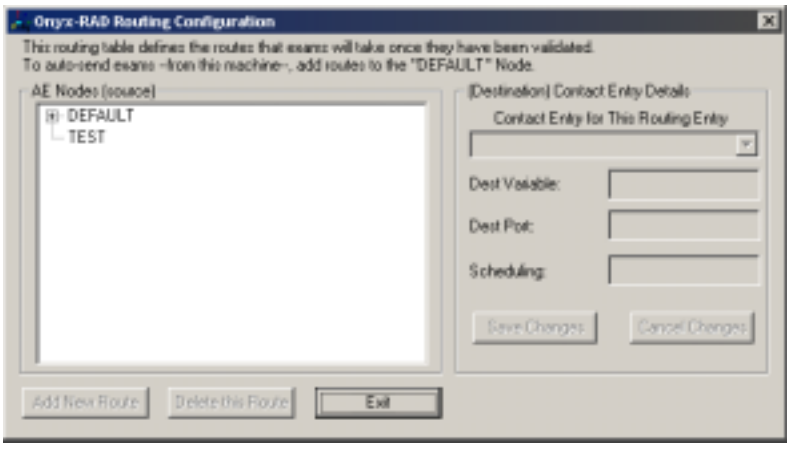
***To exit Contact Editor*:**

Click the "Exit" button to return to the main Configuration Manager window.

Exam Routing

Use the Exam Routing tool to create and manage auto transfer routes for exams. When exams are validated (i.e., marked "Unread") they will automatically be added to the push queue according to the routing rules defined here. This is especially useful for Acquire workstations that will send to a 3rd party PACS after acquiring images.

You must first enter AE Titles (if sending DICOM) in the AE Node Editor and a Contact Entry in the Contact Editor (see the previous topic.) After these steps have been taken care of, you can create a route.



***To add a route*:**

Click the node to add a default route *from*, in most cases you will click the entry titled "DEFAULT." Click the "Add New Route" button.

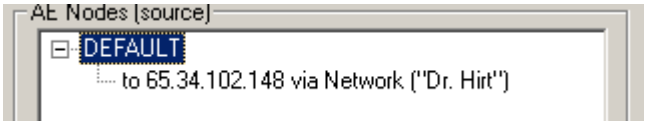
☼ Keep in mind that you must have already created a Contact Entry (using Contact Editor).

On the right side of the window, select a Push Entry from the drop down box. This box lists all the entries you have previously set up using the "Contact Editor" utility in Configuration Manager. (If you have not set up any entries, exit from this window and set up an entry first.)

The next two boxes will fill with the values stored in the contact entry (e.g., network address and port), and the scheduling box will be empty. For a temporary route, enter a specific date and time. Otherwise, enter "now" (without quotes) in the box.

Finally, click "Save Changes".

You can verify configured routes by expanding the list on the left side of the window (click the little plus box next to an AE Title to view routes.)



Click "Exit" to exit the Routing Configuration tool.

When routes are set up, exams are automatically added to the push queue (according to the routes) once they are validated.

***To edit a route*:**

Click the route in the list that you wish to edit. Its details will appear in the boxes to the right. Note that you can only change two things: the Contact Entry (from the drop-down list) and the scheduling. If you wish to make changes to the Contact Entry itself, such as the network address and port, you must use Contact Editor.

***To delete a route*:**

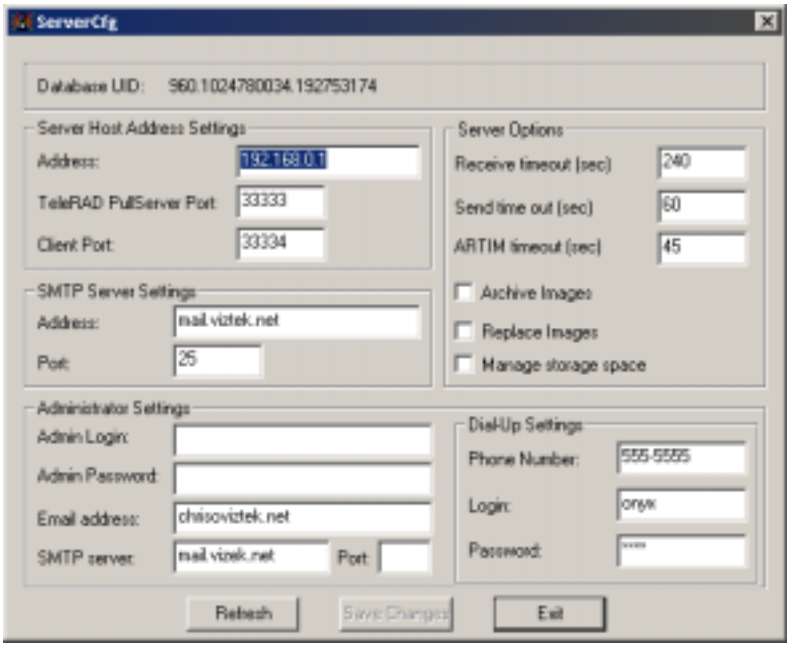
Click the route in the list that you wish to edit. Its details will appear in the boxes to the right. Click the “delete” button to delete the route.

***To exit the Exam Routing tool*:**

Click the “Exit” button to return to the main Configuration Manager window.

General Server Config

Use the General Server Config tool to configure basic parameters of your Onyx-RAD software. Though the tool is intended for Onyx-RAD Server software (as the name implies), it is also often helpful when configuring Acquire workstations.



Server Host Address Settings
Enter the server's IP address here.

TeleRAD PullServer Port and *Client Port*
Enter the appropriate port numbers here.

SMTP Server Settings
Used for emailing studies (the Contact Entry type "Email").

Administrator Settings
These settings are for administrator access.

Server Options
Set timeout limits for Receiving, Sending, and ARTIM operations. Also set whether to archive images (requires an Onyx-RAD Archive Server), Replace old image when duplicates are received, and manage storage space (requires Onyx-RAD Space Management Server.)

Dial-Up Settings
Enter dialup settings for this server. The preferred way to do this is through windows dial-up networking.

***To save changes*:**

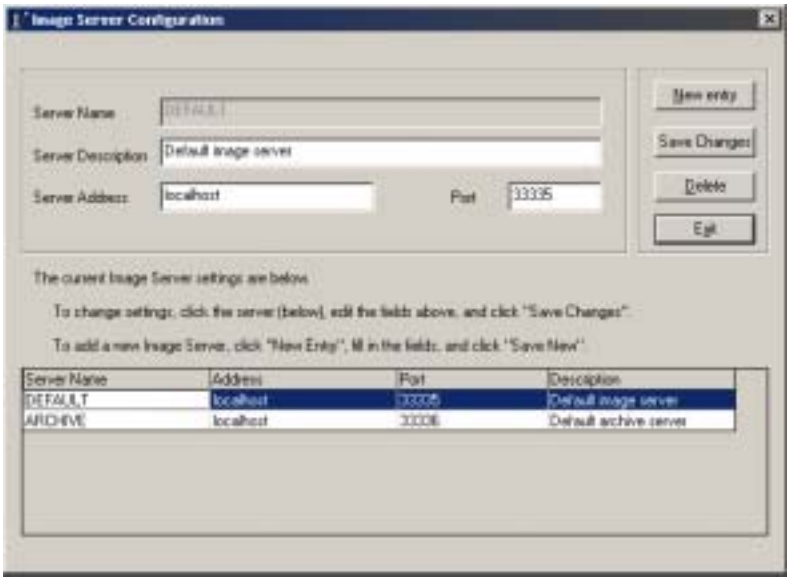
Click the “Save Changes” button.

***To exit*:**

Click the “Exit” button.

Image Server Config

Use this tool to add and manage Image Servers. This is generally only relevant where an Onyx-RAD Server is present.



***To add an image server*:**

Click “New Entry” and enter data for each field, including Name, Description, Network address and port number. Click “Save” when finished. The new image server will appear in the list at the bottom of the window.

***To edit an image server*:**

☼ You cannot edit the Name property of the default image and archive server entries.

Click the appropriate entry in the list of image servers. The fields will display the selected image server’s settings. Make changes as necessary and click “Save Changes” to make them permanent.

***To delete an image server*:**

Click the appropriate entry in the list of image servers. The fields will display the selected image server's settings. Click the "Delete" button to remove the entry.

☼ You cannot delete the default image and archive server entries.

***To exit the Image Server Configuration tool*:**

Click the "Exit" button.

Appendix
C

Space Management Server

Onyx-RAD Space Management Server is a software tool that runs in the background and monitors available hard drive space on the workstation. This chapter explores the settings available in this useful tool.

Chapter Contents

Space Management Server 196
Configuration 197
Manage by Study Date 198
Manage by Study Count 198
Manage by Disk Space.....199
Study Statuses.....199

Space Management Server

☼ Space Management Server resides in the Windows Services control panel applet.

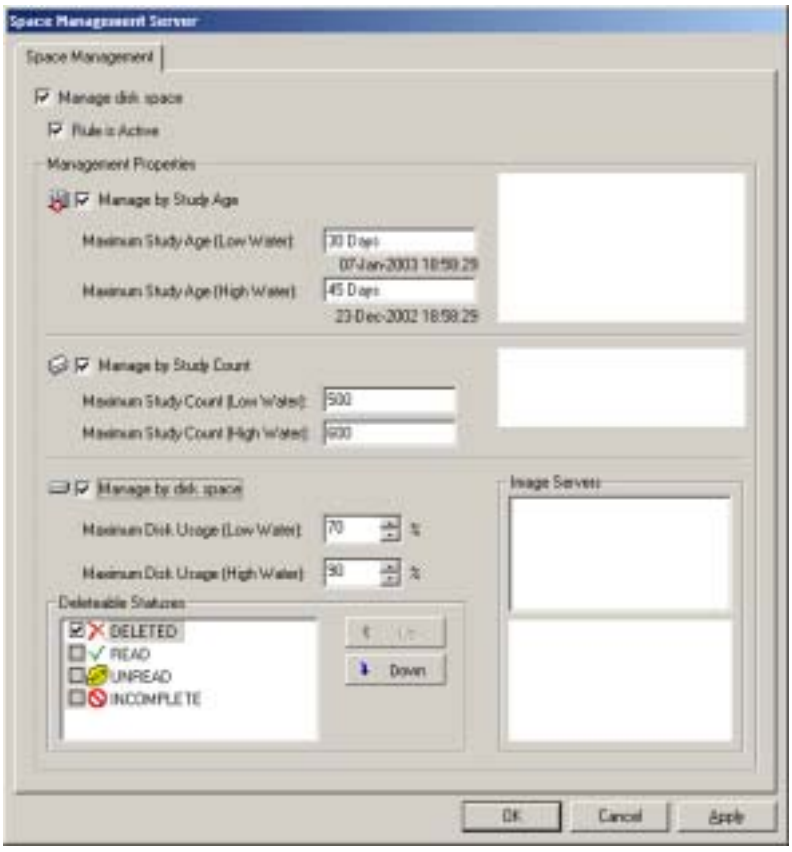
Space Management Server is a software tool that runs in the background as a Windows Service. It monitors the available space on the workstation's hard drive. As the drive begins to fill up (with medical images), Space Management Server goes into action, removing old or unwanted exams to make space for new ones.

Because removal of medical images is a careful operation, Space Management Server contains many ways to specify which exams, if any, should be chosen for deletion when the available hard drive space begins to run out.

Configuration

Configuration of Space Management Server is handled via a configuration dialog. Locate the Space Management Server icon on the Windows task bar (usually the taskbar is located along the bottom of the screen, and the software icons are located on the far right side of the task bar.)

Double-click the icon to bring up the configuration dialog:



To enable space management, check the “Manage Disk Space” checkbox, and the “Rule Is Active” checkbox.

Space Management Server has three rules for managing available hard drive space: by Study Date, by Study Count, and by Disk Space.

The rules work using a Low Water Mark/ High Water Mark theory. As studies reach the High Water mark, they are deleted until they reach the Low Water mark. Each rule is explained below in greater detail.

Additionally, only studies who have the status “DELETED” will actually be permanently removed when any of these rules goes into action. (The status of exams to be permanently removed can be changed, this is explained later.)

Manage by Study Date

This rule will monitor the date of exams. Enable this rule if you want to delete studies based on the age of the study.

Once a study reaches the High Water entry (e.g., 45 days old), Space Management Server will spring into action and delete studies until there are no studies left older than the Low Water entry (e.g., 30 days old.)

Manage by Study Count

This rule will monitor the number of exams. Enable this rule if you want to delete studies based on the number of studies.

Once the number of studies reaches the High Water entry (e.g., 600 studies), Space Management Server will delete studies until the number drops to the Low Water entry.

Manage by Disk Space

This rule will monitor actual hard disk space in use.

Once the amount of hard drive spaced used reaches the High Water entry (e.g., 90% of the disk is full), Space Management Server will delete studies until the disk returns to the Low Water mark (e.g., 70%).

Study Statuses

☼ Generally you will only want to check "DELETED" – that way only exams that were already deemed unnecessary will be permanently removed.

This list contains all the statuses that a study can possess. A study can be either Incomplete, Unread, Read, or Deleted. Statuses with a check next to them are candidates for permanent removal when Space Management Server begins removing studies.

The order of the statuses is also important. Studies whose status is higher in this list will be removed before studies with a status lower in the list.

Appendix
D

Windows 2000 Primer

Onyx-RAD software is designed to run like many other Microsoft Windows programs, in order to facilitate its use. If you are unfamiliar with Windows in general, please use this chapter to get an understanding of basic concepts in Windows.

Chapter Contents

Using the Mouse....202
Mouse Click : Left or Right button?....203
Using the Keyboard....204
Menu bars (“Menus”)....205
Context Menus....205
Toolbars....206
Scrollbars....207

Using the Mouse

The mouse is your basic interface with the computer. It has two large buttons on top (sometimes three, sometimes a mouse wheel in the center) and a ball on the bottom that detects movement. (Go ahead, pick the mouse up and look at the bottom side to see the ball!) The two large buttons are called the “left mouse button” and the “right mouse button,” respective of their placement on the mouse.

The intended method of using the mouse is to rest your hand on the top of the mouse, with your index finger positioned over the left mouse button, and your middle finger positioned over the right mouse button.

If you look at the computer screen you should notice a small white arrow. This is called the “mouse pointer.” With your hand resting on the mouse as described above, move the mouse over the desk (or mouse pad) and observe that the mouse pointer will mimic your movements. Move the mouse up, down, left, and right, in a circle, etc. and observe the mouse pointer. Practice trying to place the mouse pointer on a certain area of the screen, perhaps one of the icons you see on the screen.

The buttons are operated but simply pushing down and releasing the button. For example, to operate the left mouse button (with your hand resting on the mouse as described earlier) you simply push the button down with your index finger, then release. This is called “clicking” the mouse, named for the little click noise this action produces.

Thus, to “click” the mouse means to push one of the buttons. Note there are two buttons, so “left-click” means to click the left mouse button, and “right-click” means to click the right mouse button.

Generally one will only say to “click” something, implying the left mouse button. Indeed the left mouse button is the button used for most every task in Windows, so if you are asked to “click” something you should assume the left

mouse button is intended. If the right mouse button is intended it will always be indicated, as “right-click” or “click the right mouse button.”

This manual uses the common notation:
Click : implies clicking the left mouse button one time
Right-Click implies clicking the right mouse button one time

The other “clicking” term you hear about is to “double-click.” This means to click the left mouse button twice in quick succession. This is often a difficult technique to master for a beginning computer user, so practice makes perfect. Thankfully, Onyx-RAD Professional Workstation only makes use of the double-click in one place (selecting a study to view from the Study Listing.)

Mouse Click : Left or Right button?

The vast majority of mouse click operations in any Windows program are performed the left mouse button. Thus, whenever you are directed to “click” something, it is implied that you click with the left mouse button.

Double-click refers to rapidly clicking the mouse button twice, and also implies the left mouse button.

Right-click means to click the right-mouse button. The right mouse button is generally not used as frequently as the left, and is generally used to call up “context menus” (pop-up menus that appear when right-clicking in certain areas or contexts.)

Using the Keyboard

While most tasks utilize the mouse, there are operations requiring the keyboard. Typing in search terms, for example, or typing annotation text.

The keyboard is laid out much like a typewriter. If you are familiar with a typewriter you will feel right at home on the keyboard in a short time.

A notable addition on a computer's keyboard is the set of arrow keys. These are four keys, grouped together on the right side of the keyboard (between the main letter keys and the numerical keypad) which are labeled with arrows pointing up, down, left, and right.

The arrow keys can be used to move the cursor around while typing in text. Onyx-RAD Professional Workstation makes use of these keys as shortcut keys to scroll through series of images. Pecking the right-arrow key will take you to the next image, the left-arrow key will take you to the previous image.

Immediately above the arrow keys is a grouping of six keys also used as shortcut keys. The delete key (sometimes labeled "del" for short) can be used to delete annotations. The Home and End keys are used in navigating a series of images; Home will take you to first image, End to the final image. The Page Up and Page Down (sometimes labeled "PgDn and PgUp") will take you to the previous series or next series, respectively.

Menu bars (“Menus”)

Menu bars are found along the top of most Windows program, and are useful for concealing large menus while not in use.

Common menus seen in Windows programs are “File”, “Edit”, and “Help.” To pull down a menu from the menu bar, simply click the menu title. (For example, click “File”.) A menu drops down with entries. To activate an entry, just click it. To hide/close a menu until you need it again, simply click the menu name again (e.g., click “File” again.)

Context Menus

Context menus are pop-up menus that appear when you right-click in certain areas. For example, in Onyx-RAD Professional Workstation, if you right-click on an image in the Image Window, the Image Context Menu appears. Context menus are designed to provide quick access to functions or operations that are relevant to that part of the program.

To cancel a context menu, simply move the mouse cursor off of the context menu and click the left mouse button one time.

Toolbars

Toolbars are collections of shortcut buttons that generally appear near the top of a program window, usually under the menu bar. These buttons are designed to give quick one-click access to functions and operations in the program. For example, many Windows programs have toolbar buttons for Cut, Copy, and Paste, operations that people use quite frequently.

In Onyx-RAD Professional Workstation, many toolbar buttons also serve as an indicator regarding whether certain tools or options are enabled. For example, below are pictures of the “Magnify” toolbar button. The image on the left shows this button when the “Magnify” tool is *not* selected; the one on the right indicates the “Magnify” tool *is* selected.

(Notice that the button on the right appears “lit up” and “pushed in”.)

Scrollbars

Use of a scrollbar is quite simple, and there are a few different methods of using one:

Use the endcap arrow buttons.

To scroll down, click the down arrow button at the very bottom of the scrollbar.

To scroll up, click the up arrow button at the very top of the scrollbar.

Move the slider up or down by dragging it:
Position the mouse cursor (arrow) over the smaller gray bar contained inside the scrollbar. Holding the left mouse button down, move the mouse up or down to move the slider accordingly.

Click in the empty area of the scrollbar (in an area where the inner gray slider is not located) above or below the inner gray slider to move the bar up or down accordingly. This is similar to the operation of the “Page Up” and “Page Down” keys on the keyboard.